United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with United States Department of Agriculture, Forest Service; North Carolina Department of Environment and Natural Resources; North Carolina Agricultural Research Service; North Carolina Cooperative Extension Service; Buncombe Soil and Water Conservation District; and Buncombe County Board of Commissioners

Soil Survey of Buncombe County, North Carolina

How To Use This Soil Survey

General Soil Map

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

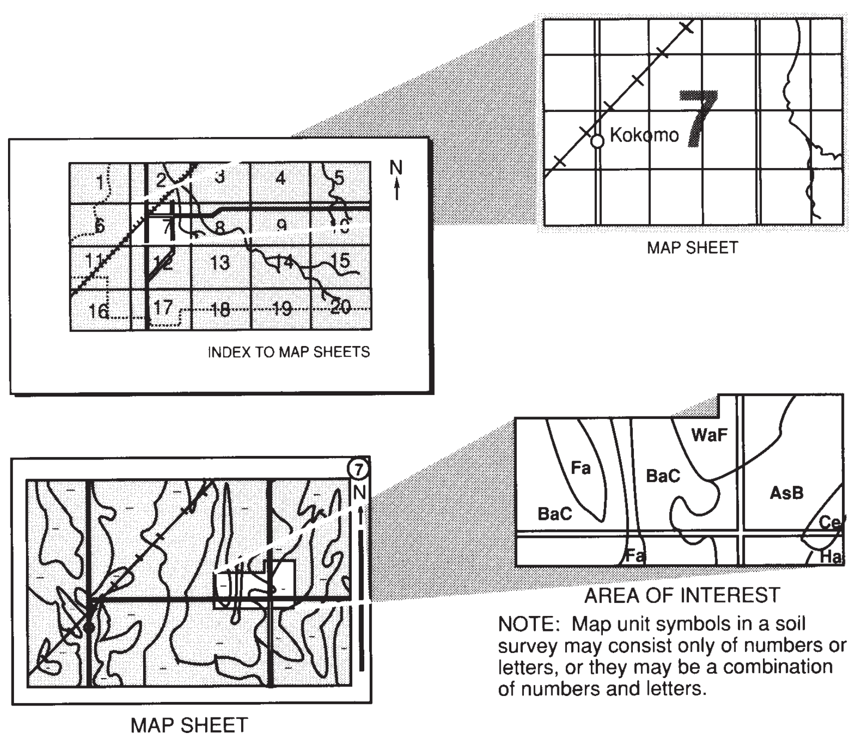
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and go to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Go to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 2004. Soil names and descriptions were approved in 2006. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2006. This survey was made cooperatively by the Natural Resources Conservation Service and the United States Department of Agriculture, Forest Service; the North Carolina Department of Environment and Natural Resources; the North Carolina Agricultural Research Service; the North Carolina Cooperative Extension Service; the Buncombe Soil and Water Conservation District; and the Buncombe County Board of Commissioners. The survey is part of the technical assistance furnished to the Buncombe Soil and Water Conservation District. The Buncombe County Board of Commissioners provided financial assistance for the survey.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: A view of the North Fork Reservoir in the Swannanoa River Valley from the Blue Ridge Parkway near Craggy Gardens. Areas in the foreground and background (left) are high mountains in the Burton-Wayah-Craggey-Balsam general soil map unit. Intermediate mountains near the reservoir are in the Edneyville-Porters-Chestnut-Unaka general soil map unit.

Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at http://www.nrcs.usda.gov.

Contents

Issued 2009

Foreword

Soil surveys contain information that affects land use planning in survey areas. They include predictions of soil behavior for selected land uses. The surveys highlight soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

Soil surveys are designed for many different users. Farmers, ranchers, foresters, and agronomists can use the surveys to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the surveys to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the surveys to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency—nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. The location of each map unit is shown on the detailed soil maps. Each soil in the survey area is described, and information on specific uses is given. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Mary K. Combs
State Conservationist
Natural Resources Conservation Service

Soil Survey of
Buncombe County, North Carolina

By Mark S. Hudson, Natural Resources Conservation Service

Soils surveyed by Mark S. Hudson, L. Brooks Hale, Milton Martinez,
Bruce P. Smith, Jr., and Tiffany M. Smith, Natural Resources Conservation Service,
and by Thomas N. Schmitt, R. Jay Ham, and Tom Cochran, North Carolina
Department of Environment and Natural Resources

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
United States Department of Agriculture, Forest Service; North Carolina Department of Environment and Natural Resources; North Carolina Agricultural Research Service; North Carolina Cooperative Extension Service; Buncombe Soil and Water Conservation District; and Buncombe County Board of Commissioners

Buncombe County is located in the central mountains of western North Carolina about 230 miles west of Raleigh, the State Capital (fig. 1). It consists of 422,284 acres, or approximately 656 square miles, of very steep mountains, rolling intermountain hills, and narrow valleys. Elevation ranges from 1,705 feet above sea level, on the French Broad River at the Madison County line, to 6,410 feet, at Potato Knob on the Buncombe and Yancey County line.

The county is in the southern Blue Ridge Mountain Physiographic Province (MLRA 130B). It is bordered on the east by McDowell County, on the south by Henderson and Rutherford Counties, on the west by Haywood County, on the north by Madison County, and on the north and east by Yancey County. According to the U.S. Census Bureau, the county had a population of 206,330 in 2000 and will have an estimated population of 235,281 by 2010. In 2000, the county seat of Asheville had a population of 68,889. Populations in the towns of Black Mountain, Woodfin, and Weaverville were 7,511; 3,162; and 2,411, respectively.

This soil survey updates the survey of Buncombe County published in July 1954 *(18)*. It provides additional information and has larger maps, which show the soils in greater detail.

General Nature of the Survey Area

This section gives general information about Buncombe County. It describes history and development; economic development; physiography, relief, and drainage; and climate.

History and Development

The Buncombe County Chamber of Commerce, the Preservation Society of Asheville and Buncombe County, the Historic Resources Commission of Asheville and Buncombe County, and the Rural Life Museum and the Southern Appalachian Center on the campus of Mars Hill College helped prepare this section.

The survey area, which is part of the French Broad River Valley, was home to the

Figure 1.—Location of Buncombe County in North Carolina.

Cherokee and Catawba Indians, who used it primarily as a hunting ground and for trading purposes. Early explorers included Daniel Boone, French botanist André Michaux, English botanist John Fraser, and Dr. Asa Gray, the “Father of American Botany.”

The first European settlers arrived in the latter half of the 1700’s. Most of these settlers were Scots-Irish and English. Due to the rugged mountains and lack of roads, the early settlers of the French Broad River Valley lived in virtual isolation. The earliest settlement was on Bee Tree Creek near the present town of Swannanoa.

Beginning in the 1790’s, the wagon road along the French Broad River was the primary trade route through the Southern Appalachian Mountains. In 1824, the North Carolina General Assembly created the Buncombe Turnpike Corporation in order to build a toll road to relieve congestion on the old wagon trail. In 1828, the Turnpike was completed, connecting Tennessee and Kentucky to the East Coast. It was the superhighway of the South and served as the route by which farm products were carried to markets in Charleston, South Carolina and Augusta, Georgia. In 1850, Asheville became a regional center for trade when the Buncombe and Western Turnpikes were joined. The area, however, remained relatively inaccessible until after the Civil War and the arrival of the railroad.

Along the Turnpike, farmers or drovers herded thousands of hogs, cattle, horses, mules, turkeys, and other stock. Livestock could only travel a few miles a day, so it was necessary to establish stock stands, or road houses, at close intervals along the route to corral and feed the stock. During the fall months it was not unusual to see a continuous line of livestock strung from Paint Rock, Tennessee to Asheville. Owners of the stands arranged with local farmers for their grain to feed the stock. On their return from the markets, drovers brought needed goods to pay their livestock feed bill. An enormous quantity of grain was needed to feed livestock at the Turnpike stands, and this demand changed the local countryside. On surrounding farms, large areas of mountain woodland were cleared and converted to cropland for grain production. The Alexander community is near where one of the more famous stock stands once stood.

In 1791, Buncombe County was created from part of Burke and Rutherford Counties. The original county was so large that it was dubbed the “State of Buncombe.” The county is named in honor of Colonel Edward Buncombe, a Revolutionary soldier who was wounded and captured at the Battle of Germantown on October 4, 1777 and later died while a prisoner in Philadelphia in May 1778. In November 1797, Morristown, a mountain village along the “great wagon road,” was incorporated as the county seat and named Asheville in honor of Samuel Ashe, Governor of North Carolina from 1796 to 1798.

In 1882, the Western North Carolina Railroad Company, bought by the Southern Railroad in 1894, completed the rail link from Asheville to Painted Rock along the wildest part of the French Broad River. This was the first railroad through the southern part of the Appalachian Mountains. This railroad ended the era of livestock drives and the Buncombe Turnpike. Until the railroad penetrated the valley, Buncombe County was mostly inaccessible to the rest of the world. By 1891, Asheville became a rail hub for the South and saw its population increase rapidly from about 2,600 in 1880 to almost 15,000 in 1900. The railroads opened up new opportunities for mountain people, and their lifestyles began to change. These changes ushered in the first Golden Age and boom period to Asheville and Buncombe County.

The railroad also allowed for rapid resource extraction of timber and minerals and encouraged the development of a tourism industry. Mining for feldspar, quartz, and mica has taken place since the late 1880’s. A few small mines, operated by local families, were scattered throughout the county. Logging extended into the most remote coves with the help of the railroads. Logging companies, for example, bought large tracts of land, built railroad lines into watersheds, and cut timber for their mills on the French Broad and Swannanoa Rivers. On steep or inaccessible terrain, mule teams dragged logs to a loading area. Cut timber then was hauled away on narrow-gauge rail or by truck on existing roads.

Tourism has played a significant role in the history and development of Buncombe County. Mount Mitchell State Park, North Carolina’s first State park, was created in 1915. It was accessed by the logging railroad from Black Mountain, which was converted to an auto toll road in 1922, and later by the Blue Ridge Parkway. The Blue Ridge Parkway was built during the 1930’s and 1940’s and traverses the high mountain ridges from Craggy Dome to Asheville and Mt. Pisgah. It has brought thousands of visitors to the area, and many summer homes have been developed since the 1940’s and 1950’s.

Prosperity for Buncombe County rode on the first trains to conquer the Blue Ridge Mountains. Ease of access and an ideal climate now made Asheville a destination for tourists and for the sick. Health care specialists came and expanded the county’s growing reputation as a health center. Sanitariums dotted the hillsides for the many tuberculosis patients arriving for treatment. It was thought the combination of altitude and climate found in Asheville promoted a cure. Also, many fine accommodations, such as the Battery Park Hotel, and boarding houses were built to cater to the influx of travelers. Area resorts consisted of large hotels, riding stables, bath houses, and marble pools surrounded by landscaped lawns with croquet, tennis courts, and golf courses. Asheville became known as a fashionable tourist resort with many of the nation’s most prosperous and prestigious visiting the area; one could experience a life as elegant and luxurious as that enjoyed in almost any of the country’s resort areas.

Following a population decline after the Great Depression and World War II, Buncombe County has grown steadily since the mid 1960’s. Several factors have contributed to this growth. Economic opportunities in the form of light industry and providing goods and services in support of the tourist industry have reduced out-migration by the local population. Construction is also providing an increasing number of jobs. Buncombe County offers a high quality of life, and entrepreneurs are moving to the area to start small businesses. Many retirees, having built summer homes in the past, are permanently settling here.

Economic Development

Initially, Buncombe County had a subsistence-based agricultural economy. Toward the end of the 19th century, the railroad opened up the area to large-scale timber and mining operations. By the late 1920’s and early 1930’s, most of the marketable timber was cut and the chestnut blight closed out the era of the timber baron. The lumber

business as a major industry came to an end. In addition, the move from mica-based electrical conductors to quartz-based semiconductors closed down the small mines.

During a time of profound timber harvesting, when trees were viewed as a nearly inexhaustible resource, conservation initiatives to better plan and manage woodland began. American forester Gifford Pinchot selected Carl Schenck as chief forester for George Vanderbilt and his Biltmore Estate property near Asheville, North Carolina. Pinchot was the first forester hired by Mr. Vanderbilt. That appointment led to the founding of the first forestry school in North America, later to be called the “Cradle of Forestry.” In 1895, Carl Schenck accepted Vanderbilt’s offer to be manager of the Biltmore Estate forest properties. For more than a decade, Dr. Schenck focused all of his forestry skills on managing and improving Vanderbilt’s 120,000-acre forest in western North Carolina. On October 17, 1916, much of that woodland became Pisgah National Forest, one of the first national forests in the eastern United States.

Today, the county has a mixed industrial, medical, educational, and agricultural economy. With 273,615 acres, or 65 percent of the county in woodland, forest products are also an important industry. The growing conditions in the county are conducive to the production of quality hardwoods. In 2002, according to the Buncombe Chamber of Commerce and North Carolina Agricultural Statistics, income from forest products was $4,720,000. The light industrial base also includes manufacturing machinery, electrical components, computers, packaging, and several transportation and heavy construction facilities. In 2007, approximately 13 percent of the work force was in manufacturing, 17 percent in educational and health services, 7 percent in construction, 58 percent in other services, and 5 percent in agriculture.

In 2002, according to the North Carolina Department of Agriculture, the county had 1,192 farms covering 94,934 acres. There were 38,851 acres of cropland with 17,522 acres of harvested cropland. In 2005, cash receipts totaled $92,105,000. The major agricultural products are burley tobacco, hay, corn silage, beef cattle, and milk cows. Specialty crops, such as vegetables, fruits, berries, and apples, are also raised. Also on the increase are goats for dairy and meat production. Burley tobacco is grown on many farms and supplements the income of many factory workers. The production of Christmas trees and native ornamentals has leveled off in recent years. Organic farming has continued to increase, providing a variety of fresher, locally grown products for grocers, community-supported agriculture, restaurants, and tailgate markets. Generally, farms are small, are specialized, and grow a high-value crop.

There are several institutions of higher learning in Buncombe County. The major ones are the University of North Carolina at Asheville, Asheville-Buncombe Technical Community College, Montreat College, and Warren Wilson College. These and other educational facilities offer a diversity of learning opportunities, drawing students from across the country, and are an important factor in the total economy of the area.

Tourism and its related businesses are a vital part of the economy. The scenic 6,115 acres along the Blue Ridge Parkway, the 55,360 acres of Pisgah National Forest (managed by the U.S. Forest Service), and the 1,469 acres of Mount Mitchell State Park are hubs for much of this activity. Other attractions, such as the North Carolina Arboretum, the Biltmore Estate, which is the largest privately owned home in the country, and the various festivals, draw many to the area. Agri-tourism is a growing business which packages mountain excursions complete with u-pick, teaching farms, and local folk art and crafts that illustrate the mountain culture. Also, second home construction and the mountain arts and craft tradition contribute greatly to the economic development of Buncombe County.

Physiography, Relief, and Drainage

Buncombe County is in the southern Blue Ridge Mountain Physiographic Province. The physiography of the county consists of high, intermediate, and low mountains;

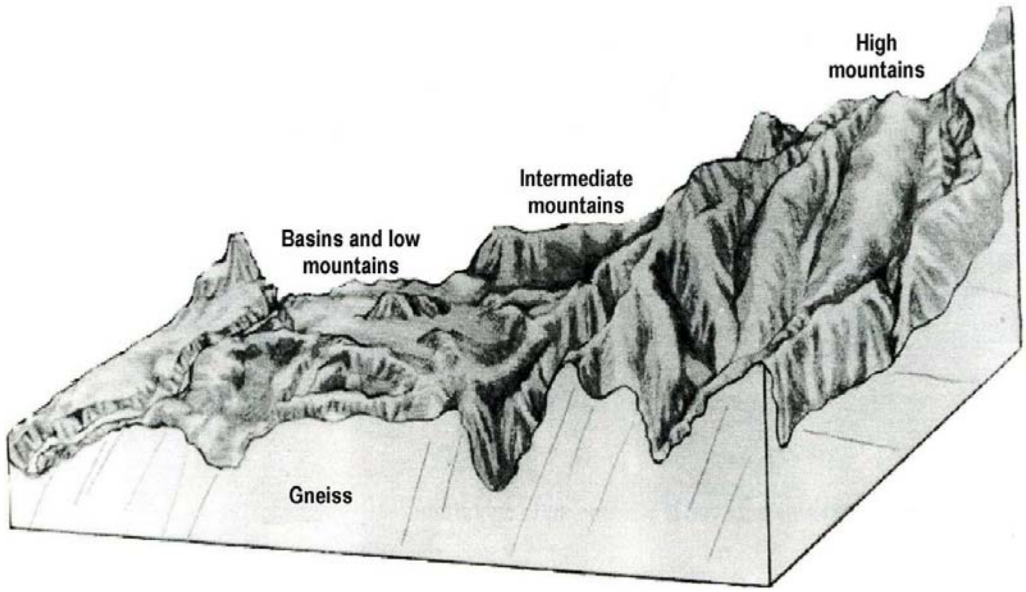


Figure 2.—A physiographic cross-section of Buncombe County illustrating the complex topography of mountain landscapes.

intermountain hills; coves; terraces; and flood plains *(14).* Elevation ranges from 1,705 feet above sea level, on the French Broad River at the Madison County line, to 6,410 feet, at Potato Knob on the Buncombe and Yancey County line (fig. 2).

The high mountain landscape is above about 4,600 feet in elevation. It has steep or very steep soils on side slopes, gently sloping to steep soils on ridgetops, and moderately steep or steep soils in coves. The well drained soils are shallow to very deep to hard or weathered bedrock. The clay content of the subsoil is low. The surface layers are thick and have a very high content of organic matter. Surface stones and boulders are common. In places rock outcrops occur. This landscape is subject to very cold temperatures and windswept conditions. High mountains are confined to the northwest, northeast, and southwest portions of the county. Potato Knob, Craggy Gardens, Mt. Pisgah, and Sandymush Bald are examples.

The intermediate mountain landscape ranges from 3,500 to 4,800 feet in elevation. It is the most extensive landscape in the county. It has moderately steep to very steep soils on side slopes and gently sloping to steep soils on ridgetops. These soils are shallow to very deep to hard or weathered bedrock and are well drained to somewhat excessively drained. Very deep, moderately steep or steep, well drained soils are in coves and in drainageways where surface stones and boulders are common. In general, clay content in the subsoil is low at the higher elevations and medium at the lower elevations. The soils on cool aspects, in coves, and in drainageways have thick surface layers that have a high content of organic matter. In places rock outcrops occur. Intermediate mountains occur throughout the county. Spivey Mountain, Pinnacle Knob, Flat Top Mountain, and Merrill Mountain are examples.

The low mountain landscape ranges from 2,400 to 3,500 feet in elevation. It has moderately steep to very steep soils on side slopes and gently sloping to strongly sloping soils on ridgetops. The soils are shallow to very deep to weathered bedrock and are well drained to somewhat excessively drained. Very deep, strongly sloping to steep, well drained soils are in coves and in drainageways. In general, the clay content of the subsoil is medium or high. The soils on ridgetops commonly contain more clay than those on side slopes. In coves, soils are very deep, gently sloping to moderately steep, and well drained. The soils on cool aspects, in coves, and in drainageways

have thick surface layers that have a high content of organic matter. Low mountains occur throughout the county and are usually extensions of larger mountain ranges, such as the Great Craggy, Swannanoa, Newfound, Stradley, or Black Mountains. They also occur within the intermountain hills landscape.

The intermountain hills landscape ranges from 1,800 to 2,800 feet in elevation. It has strongly sloping to steep soils on side slopes and gently sloping to strongly sloping soils on ridgetops. Soils are moderately deep to very deep to weathered bedrock. Surface layers are thin or eroded and have a low content of organic matter. The clay content of the subsoil is medium or high. Soils on the ridgetop usually contain more clay than soils on the side slopes.

In coves, soils are very deep, gently sloping to moderately steep, and well drained. Surface layers, where uneroded, are medium or thick, commonly contain rock fragments, and have a medium or high content of organic matter. The clay content of the subsoil is medium or high. The intermountain hills occur mostly along Avery, Cane, Reems, Dix, and Hominy Creeks in and around the Fairview, Avery Creek, Chandler, Leicester, and Juno communities.

Terraces have nearly level to strongly sloping soils, are narrow, and run parallel to the streams. Soils are very deep, and the clay content of the subsoil is high. Surface layers, where uneroded, are medium or thick, commonly contain rock fragments, and have a medium or high content of organic matter. Many terraces occur in the Fairview, Sandymush, and Newfound communities and near the towns of Black Mountain, Swannanoa, and southern Asheville. Generally, terraces occur above the larger flood plains of intermountain hills and low mountain areas.

Flood plains have nearly level soils which run parallel to the stream channel. In general, soils next to major streams and rivers and in the lower end of watersheds are well drained to somewhat poorly drained and moderately deep to very deep to gravelly strata. The Chandler, Cane Creek, and Swannanoa areas are examples. The upper end of watersheds are moderately well drained and shallow or moderately deep to gravelly strata. The Barnardsville, Dillingham, Biltmore Village, and Sandymush areas are examples. Along the smaller streams and branches, soils are moderately well drained or somewhat poorly drained and moderately deep to gravelly strata. Bent Creek and Bee Tree Creek are examples. Poorly drained soils occur on the broader flood plains throughout the county. In general, the clay content of the subsoil is low but ranges to medium along the lesser streams and at the lower end of watersheds. The surface layers, where they have not been scoured by flooding, are medium or thick and have a medium or high content of organic matter.

Buncombe County is located on the Eastern Continental Divide and most of the streams drain toward the Gulf of Mexico. The eastern portion of the county is drained by the Swannanoa River and Big Ivy and Reems Creeks, originating near the Black and Craggy Mountains Ranges, and by Cane Creek, originating from the Swannanoa Mountains. The western portion of the county is drained by Newfound, Turkey, Hominy, Avery, and Sandymush Creeks. These creeks originate in the Newfound Mountains and Mt. Pisgah area in the western part of the county. These tributaries are the majority of the county’s drainage which flows into the French Broad River. Most of the county drains to the north. The French Broad River continues northwest through the river gorge into Madison County, North Carolina; Cocke County, Tennessee; Douglas Lake; the Holston, Tennessee, Ohio, and Mississippi Rivers; and then the Gulf of Mexico. The southeastern portion of Buncombe County is east of the Continental Divide and is drained by the headwaters of the Broad River. The Broad River flows southeast to the Congaree and Santee Rivers in South Carolina and then to the Atlantic Ocean.

In the northeastern part of the county, the Big Ivy Creek Watershed flows west where it joins Little Ivy Creek at Falls of Ivy and then it flows into Madison County as the Ivy River and joins the French Broad River near Rollins, southeast of Marshall.

Major drainage areas in the western half that are below Forks of Ivy are Adkins Branch, Gentry Creek, Eller Branch, Allman Branch, and Blackstock Branch. Above the forks in the eastern half are Morgan Branch, Poverty Branch, Haw Creek, Sugar Creek, North Fork Ivy, Carter Creek, Paint Fork, Stony Creek, and Dillingham Creek.

The northwestern portion of the county is in the Sandymush, Newfound Creek, and Jenkins Branch Watersheds. Major drainage in the Sandymush Watershed east of Canto is Turkey Creek (North and South Forks) and Martin Creek. Major drainage areas west of Canto are Bee Branch, Willow Creek, Sugar Creek, Hogeye Branch, and Gilbert Branch. Sandymush Creek flows northeast along the Buncombe and Madison County line until it joins the French Broad River just south of Bailey Bend. Newfound Creek and Jenkins Branch Watersheds flow northeast where they join the French Broad River south of the Alexander community. Major drainage for Newfound Creek areas are Parker Branch, Sluder Branch, Little Creek, Round Hill Branch, Morgan Branch, Gouches Branch, and Dix Creek.

In the southwestern part of the county, the Hominy, Bent, Avery, and Smith Mill Creek Watersheds flow northeast. Major drainage of the Hominy Creek Watershed is Webb Branch, Ragsdale Creek, Moore Creek, Pole Creek, Beaverdam Creek, Stony Fork, Warren Creek, Glady Fork, South Hominy Creek, and Curtis Creek. Hominy Creek flows northeast and joins the French Broad River just west of Asheville. The smaller Bent, Avery, and Smith Mill Creek Watersheds also flow east and north to join the French Broad River near the Western North Carolina Farmers Market, Sandy Bottoms River Park just north of Buck Shoals, and the Emma Community, respectively.

The Swannanoa and Broad Rivers and Cane Creek drain the southeastern portion of the county. Major drainage in the westward-flowing Swannanoa River Watershed is Gashes, Sweeten, Christian, Haw, and Bee Tree Creeks and Camp, Grassy, Bull, and Tomahawk Branches. The Cane Creek Watershed flows southwest and includes Garren, Ashworth, Brush, Flat, Merrill Cove, and Gap Creeks. The Broad River Watershed includes Crooked, Rocky, Grassy, and Flat Creeks and Clear Branch. The Swannanoa River joins the French Broad River at Biltmore Village, and Cane Creek joins it just south of the Asheville Regional Airport in Henderson County. The Broad River flows south and east into Lake Lure in Rutherford County.

Climate

In Buncombe County, the climate of the mountains differs greatly from that of the intermountain hills and flood plains. Climate and the weather are influenced by elevation, aspect, and wind direction, which is dominantly from the west. As elevation increases, rainfall amounts increase and temperature decreases. Temperatures are cooler on north- to east-facing aspects. Daily temperatures can fluctuate widely, and cold or warm spells are possible year-round. There is a chance of frost in the high mountains during the summer months.

Precipitation is generally evenly distributed throughout the year. Summer precipitation falls chiefly during thunderstorms. Heavy rains from prolonged storms occasionally cover the entire area (or individual watersheds) and cause severe flooding in valleys. Several inches of moisture are added to the soil by fog condensing on trees and flowing down the trunk at the higher elevations in summer. In winter, precipitation in valleys is chiefly rain with occasional snow. In the mountains, especially above 4,000 feet in elevation, it is chiefly snow although rains are frequent. Ice storms and rime ice occur on high mountains and on prominent ridgetops and upper side slopes of intermediate mountains (fig. 3). In Buncombe County snow cover does not persist except at high elevations and on northerly aspects.

Table 1 gives data on temperature and precipitation for the survey area as recorded at the Asheville Regional Airport, just south of Asheville, North Carolina, in the period

Figure 3.—Rime ice occurs on high mountains and on ridgetops and upper side slopes of prominent intermediate mountains.

1971 to 2000. **Table 2** shows probable dates of the first freeze in fall and the last freeze in spring. **Table 3** provides data on the length of the growing season. For additional climatic information, go to http://www.wcc.nrcs.usda.gov/climate/.

In winter, the average temperature is 39.3 degrees F and the average daily minimum temperature is 29.6 degrees. The lowest temperature on record, which occurred at Asheville on January 21, 1985, was -17 degrees. In summer, the average temperature is 72.9 degrees and the average daily maximum temperature is 83.1 degrees. The highest recorded temperature, which occurred at Asheville on August 20, 1983, was 99.0 degrees.

Growing degree days are shown in **table 1**. They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall. Slow air drainage allows frost pockets to form in late spring and early fall in nearly level or gently sloping areas that are low on the landscape (fig. 4). These areas have a shorter growing season than the county average.

Annual precipitation varies throughout the county. Because of prevailing weather patterns, generally moving west to east, more precipitation is deposited near the higher mountains. This results in a typical rain shadow in the north-central portion of the county. Average rainfall ranges from 35 to 40 inches in the area north of Asheville to more than 70 inches on Mt. Pisgah. Estimated annual rainfall is 50 to 54 inches on Sandymush Bald, along the Buncombe-Madison County line in the northwest; about 58 to 62 inches on Potato Knob, along the Buncombe-Yancey County line in the eastern parts of the county; and 42 to 50 inches, south of Asheville to Arden near Henderson County. The lowest average annual precipitation in North Carolina occurs

north of Asheville, from the Alexander community north into Madison County near Marshall and Mars Hill. This area is in a rain shadow and annually receives 35 to 38 inches of rain.

The average annual precipitation at Asheville is 47.07 inches. Of this, 27.37 inches, or about 58 percent, usually falls in April through October. The growing season for most crops falls within this period.

The heaviest 1-day rainfall during the period of record was 3.55 inches, recorded at Asheville on October 4, 1964. Thunderstorms occur on about 44 days each year, and most occur between May and August.

The average seasonal snowfall is 13.7 inches. The greatest snow depth at any one time during the period of record was 20 inches, recorded on March 13, 1993. On an average, 8 days per year have at least 1 inch of snow on the ground. The heaviest 1-day snowfall on record was 16.3 inches, recorded on December 3, 1971.

The average relative humidity in mid-afternoon is about 57 percent. Humidity is higher at night, and the average at dawn is about 87 percent. Where air drainage is slow, near seeps and springs and along flowing water, average daytime relative humidity is higher. The sun shines 59 percent of the time possible in summer and 41 percent in winter. The prevailing wind is highly dependent on location in this mountainous county. Valleys, however, channel the wind flow in all directions throughout the year. Average windspeed is highest, around 9 miles per hour, in the winter and early spring months. High mountain ridgetops and side slopes and prominent intermediate mountain ridgetops are windswept. Sustained winds of more than 25 miles per hour are common.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations,

Figure 4.—Slow air drainage allows frost pockets to form in late spring and early fall in nearly level or gently sloping areas that are low on the landscape. These areas have a shorter growing season than the county average.

Figure 5.—An example of steep mountain side slopes ranging from 30 to 50 percent.

and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-geology-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

A soil boundary or map unit delineation designates the landform and slope on which a soil occurs. Landform (position) is the three-dimensional part of the land surface and has a distinctive shape. Examples include flood plain, cove, side slope, and ridgetop. The slope (steepness) is given as a range, such as 15 to 30 percent (fig. 5). All or part of the slope range may exist within a delineation.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size and shape of soil aggregates, kind and amount of rock

fragments, distribution of plant roots, reaction, and other features that enable them to identify the soils. After describing the soils and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research *(4)*.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. The data from these analyses and tests and from field-observed characteristics and soil properties are used to predict behavior of the soils under different uses *(4)*.

Interpretations are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a relatively high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in accurately locating boundaries.

Survey Procedures

The general procedures followed in making this survey are described in the “National Soil Survey Handbook” *(16)* of the Natural Resources Conservation Service and in the “Soil Survey Manual” *(21)*.

Before fieldwork began, preliminary boundaries of slopes and landforms were plotted stereoscopically on leaf-off aerial photographs taken in March of 1985 at a scale of 1:12,000. United States Geological Survey geologic and topographic maps at a scale of 1:24,000 were also used. Map units were then designed according to the pattern of soils interpreted from photographs, maps, and field observations.

Traverses in the valleys were made by truck or on foot. The soils were examined at intervals ranging from a few hundred feet to about $^1/_4$ mile, depending on the landscape and soil pattern. Observations of special features, such as landforms, vegetation, and evidence of flooding, were made continuously without regard to spacing. Soil boundaries were determined on the basis of soil examinations, observations, and photo interpretations. In many areas, such as those where very steep slopes intersect with flood plains, these boundaries are precise because of an abrupt change in the landform. The soils were examined with the aid of a hand probe, a bucket auger, or a spade to a depth of about 3 to 5 feet. The typical pedons were observed in pits dug by hand or with a back hoe.

Traverses in the mountainous areas were made by truck or on foot along the

existing network of roads and trials. These traverses commonly were made a few miles apart where the geologic materials and landscapes were uniform. In areas where differences in geologic material or landscape were observed, traverses were made at intervals close enough for the soil scientists to observe any differences among the soils. Examinations were made at intervals ranging from a few hundred feet to about 1/4 mile. Observations of landforms and vegetation were made continuously without regard to spacing. Where soil profiles were readily observable, such as along recently constructed access roads and along logging roads, observations of the content of rock fragments, depth to bedrock, depth of rooting, the landform, and the underlying material were made without regard to spacing. Soil boundaries were plotted stereoscopically on the basis of parent material, landform, and relief. Many of these boundaries cannot be exact because they fall within a zone of gradual change between landforms, such as an area where a mountain ridge becomes a mountainside. Much intermingling of the soils occurs in these zones.

Samples for chemical and physical analyses were taken from the site of the typical pedon of the major soils in the survey area. Most of the analyses were made by the Soil Survey Laboratory, Lincoln, Nebraska. Some soils were analyzed by the North Carolina State University Soils Laboratory, Raleigh, North Carolina. Commonly used laboratory procedures were followed *(17)*.

After completion of the soil mapping on un-rectified aerial photographs, map unit delineations and surface drainage were transferred by hand. Cultural features were transferred from 7.5-minute topographic maps of the United States Geological Survey. Soil survey data was compiled and digitized onto orthophotographs at a scale of 1:12,000 (1 inch equals 1,000 feet). The finished soil survey for Buncombe County, North Carolina, is posted online (http://websoilsurvey.nrcs.usda.gov/app/).

General Soil Map Units

The general soil map in this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The general soil map units in this survey area are as follows:

Burton-Craggey-Wayah-Balsam

Junaluska-Brasstown-Tate-Northcove

Soco-Sylco-Stecoah-Cataska

Edneyville-Chestnut-Porters-Toecane

Unison-Braddock-Dillard-Statler (fig. 6)

Rosman-Iotla-Biltmore-French (fig. 6)

Evard-Cowee-Tate

Tusquitee-Tate-French-Toecane

Cleveland-Ashe-Rock Outcrop-Oteen

Walnut-Oteen-Mars-Hill (fig. 7)

Clifton-Evard-Tate-Cowee (fig. 8)

Fannin-Lauada-Micaville-Brownwood

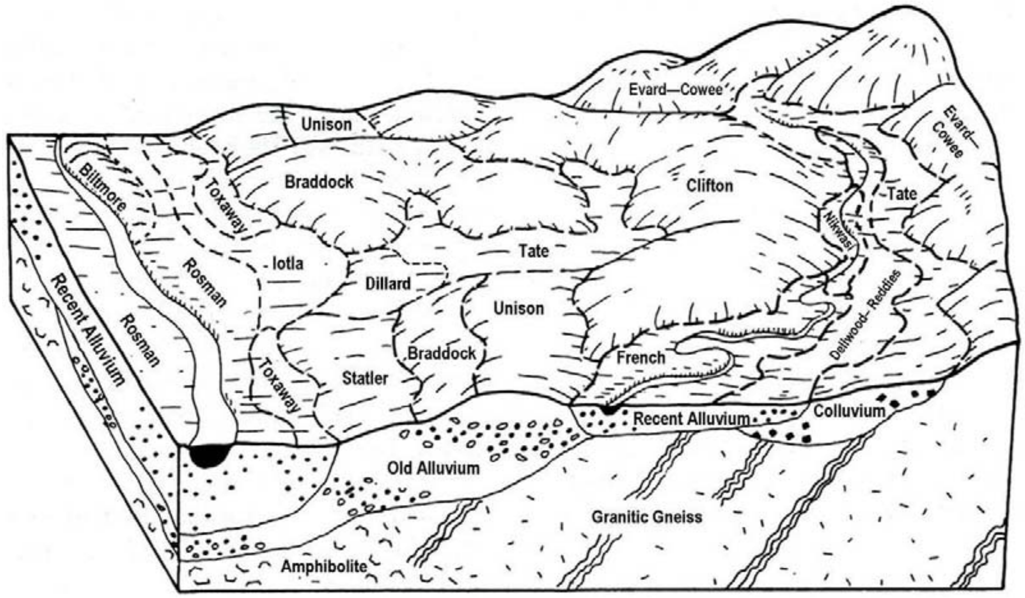


Figure 6.—Typical relationship of soils, landform position, and parent materials in the Unison-Braddock-Dillard-Statler and the Rosman-Iotla-Biltmore-French general soil map units.

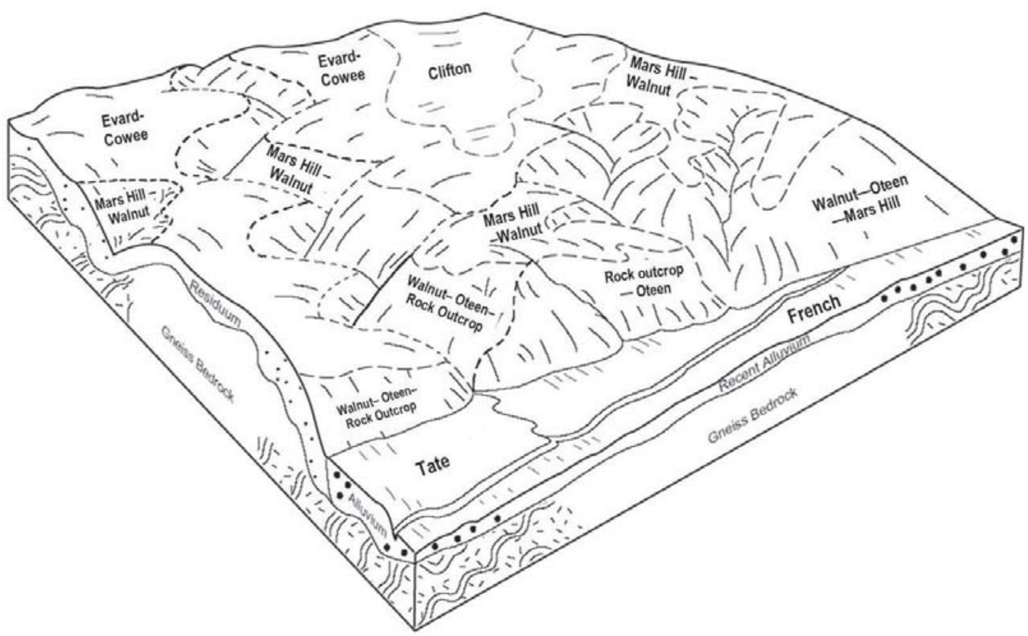


Figure 7.—Typical relationship of soils, landform position, and parent materials in the Walnut-Oteen-Mars Hill general soil map unit.

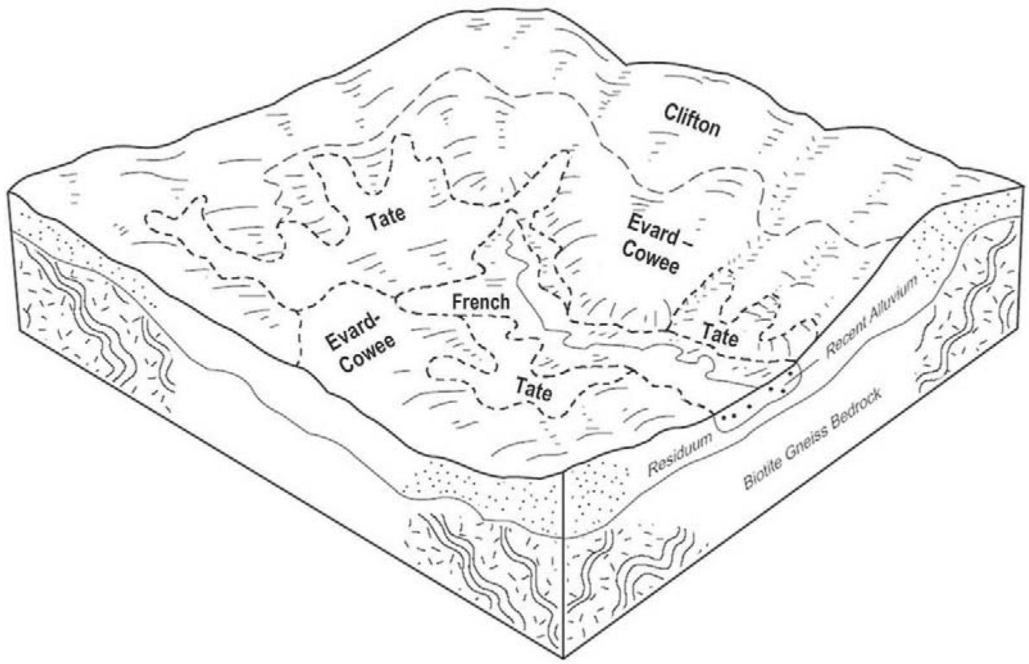


Figure 8.—Typical relationship of soils, landform position, and parent materials in the Clifton-Evard-Tate-Cowee general soil map unit.

Detailed Soil Map Units

The map units delineated on the detailed soil maps represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given under the heading “Use and Management of the Soils.”

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soil. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units these latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit and thus do not affect use and management. These are called non-contrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soils maps because of the scale used in mapping. The inclusions of contrasting soils are identified in the map unit descriptions. A few may not have been observed and consequently are not mentioned in the descriptions, especially when the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no was diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. The soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a

soil phase commonly indicates a feature that affects use or management. For example, Clifton clay loam, 8 to 15 percent slopes, moderately eroded, is a phase of the Clifton series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Mars Hill-Walnut complex, 30 to 50 percent slopes, stony, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The Rock outcrop part of Unaka-Rock outcrop complex, 50 to 95 percent slopes, very bouldery, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Soil Survey as a Land Management Tool

The purpose of this soil survey is not to prescribe (dictate) specific methods for overcoming limitations but to point out or flag soil properties and site features so they can be addressed by land managers and users. In the following detailed map unit descriptions, these are referred to as management concerns. Management measures are options or reference points to consider for a given use.

Soil interpretations and limitations are based on the potential risk that soil properties and site features pose for a given use. During the survey these were referenced by field observations, by laboratory analysis, and through contact with local land use professionals. Updating soil interpretations is a dynamic process. As more information is collected and land management practices are developed or modified, interpretations and suitabilities may be revised.

Site-specific features should also be considered. An onsite investigation may be necessary to determine if any or all of the management concerns affect the use in question or if the management measures are relative. The goals of the land manager or user and the resources available to them then determine the suitability (favorability) of any soil map unit for a given use (fig. 9).

Soil Interpretations and Suitability Ratings

A suitability rating identifies the degree to which the soils in a map unit are favorable for a given use within the survey area.

Well suited. The soils have properties favorable for the use. There are no soil limitations although inclusions of limiting, dissimilar soil or site features may be present. Good soil performance and low maintenance can be expected. Vegetation or other attributes can easily be maintained, improved, or established.

Suited. The soils are moderately favorable for the use. One or more soil properties make these soils less desirable than those rated well suited. Vegetation or other attributes can be maintained, improved, or established but a more intensive management effort is needed to maintain the resource base.

Poorly suited. The soils have one or more soil properties that are unfavorable for the use. Overcoming the unfavorable property requires special design, extra maintenance, or costly alteration. Vegetation or other attributes are difficult to establish or maintain.

Unsuited. The expected performance of the soils is unacceptable and generally should not be undertaken.

Figure 9.—This survey is designed for many different land uses, including agriculture, forestry, and housing. Soil properties and site features that affect land use are identified, and management measures are offered for consideration.

AcD—Ashe-Cleveland-Rock outcrop complex, 15 to 30 percent slopes, very stony

Setting

Landscape: Low and intermediate mountains in the eastern and western parts of the county
Elevation range: 1,800 to 4,500 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: Up to 44 acres

Composition

Ashe soil and similar inclusions: 40 percent
Cleveland soil and similar inclusions: 30 percent
Rock outcrop: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Ashe

Surface layer:
0 to 5 inches—very dark gray sandy loam
5 to 7 inches—very dark grayish brown gravelly fine sandy loam

Subsoil:
7 to 23 inches—dark yellowish brown gravelly sandy loam
23 to 29 inches—yellowish brown gravelly sandy loam

Bedrock:
29 to 34 inches—weathered biotite gneiss
34 to 80 inches—unweathered, hard biotite gneiss

Cleveland

Surface layer:
0 to 3 inches—very dark grayish brown sandy loam
3 to 5 inches—dark yellowish brown sandy loam

Subsoil:
5 to 17 inches—dark yellowish brown sandy loam

Bedrock:
17 to 81 inches—unweathered, hard granitic gneiss

Rock outcrop

The Rock outcrop is dominantly granite and biotite gneiss bedrock.

Properties and Qualities of the Ashe and Cleveland Soils

Depth class: Ashe—moderately deep; Cleveland—shallow
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Ashe—low; Cleveland—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Ashe—20 to 40 inches to hard bedrock; Cleveland—10 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contact

Minor Components

Dissimilar inclusions:
- Random areas of Buladean and Edneyville soils that have soft bedrock at a depth of 40 to more than 60 inches
- Soils that have hard bedrock at a depth of 1 to 10 inches; adjacent to rock outcrops
- Random areas of soils that have more mica in the subsoil and have hard bedrock at a depth of more than 40 inches
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Areas of rubble land; below rock outcrops and in drainageways

Figure 10.—An area of Ashe-Cleveland-Rock outcrop complex, 15 to 30 percent slopes, very stony. Because the Rock outcrop is intricately mixed with the Ashe and Cleveland soils, this map unit has marginal use potential.

- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Ashe and Cleveland soils that have coarse sandy loam, fine sandy loam, and loam surface layers
- Random areas of Chestnut soils that have soft bedrock at a depth of 20 to 40 inches

Land Use

Dominant Uses: Wildlife habitat and woodland (fig. 10)
Other Uses: Recreation and pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Equipment use, erodibility, rooting depth, droughtiness, and soil fertility
Management measures and considerations:
- This map unit is difficult to manage for pasture and hay production because of the slope, erodibility, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.
- The slope limits equipment use in the steeper areas.

- Because of the low available water capacity due to the moderately deep and shallow rooting depth, this soil is difficult to manage for the production of pasture and hay crops.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, low volume, depth to bedrock, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tanks because of the slope, depth to bedrock, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Ashe—4s; Cleveland—7s; Rock outcrop—8s

ArE—Ashe-Cleveland-Rock outcrop complex, 30 to 50 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains in the eastern and western parts of the county
Elevation range: 1,700 to 4,500 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 122 acres

Composition

Ashe soil and similar inclusions: 40 percent
Cleveland soil and similar inclusions: 30 percent
Rock outcrop: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Ashe

Surface layer:
0 to 5 inches—very dark gray sandy loam
5 to 7 inches—very dark grayish brown gravelly fine sandy loam

Subsoil:
7 to 23 inches—dark yellowish brown gravelly sandy loam
23 to 29 inches—yellowish brown gravelly sandy loam

Bedrock:
29 to 34 inches—weathered biotite gneiss
34 to 80 inches—unweathered, hard biotite gneiss

Cleveland

Surface layer:
0 to 3 inches—very dark grayish brown sandy loam
3 to 5 inches—dark yellowish brown sandy loam

Subsoil:
5 to 17 inches—dark yellowish brown sandy loam

Bedrock:
17 to 81 inches—unweathered, hard granitic gneiss

Rock outcrop

The Rock outcrop is dominantly granite and biotite gneiss bedrock.

Properties and Qualities of the Ashe and Cleveland Soils

Depth class: Ashe—moderately deep; Cleveland—shallow
Drainage class: Somewhat excessively drained
General texture class: Loamy

Permeability: Moderately rapid
Available water capacity: Ashe—low; Cleveland—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Ashe—medium; Cleveland—high
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Ashe—20 to 40 inches to hard bedrock; Cleveland—10 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contact; soil slippage potential when soil is saturated or when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of Buladean and Edneyville soils that have soft bedrock at a depth of 40 to more than 60 inches
- Soils that have hard bedrock at a depth of 1 to 10 inches; adjacent to rock outcrops
- Toecane and Tusquitee soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways, below rock outcrops, and on benches and toeslopes
- Random areas of soils that have more mica in the subsoil and have hard bedrock at a depth of more than 40 inches
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Areas of rubble land; below rock outcrops and in drainageways
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Ashe and Cleveland soils that have coarse sandy loam, fine sandy loam, and loam surface layers
- Random areas of Chestnut soils that have soft bedrock at a depth of 20 to 40 inches

Land Use

Dominant Uses: Wildlife habitat and woodland

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns:
- This map unit is difficult to manage for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, low volume, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tanks because of the slope, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Ashe and Cleveland—7s; Rock outcrop—8s

ArF—Ashe-Cleveland-Rock outcrop complex, 50 to 95 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains in the eastern and western parts of the county
Elevation range: 1,700 to 4,500 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 147 acres

Composition

Ashe soil and similar inclusions: 40 percent
Cleveland soil and similar inclusions: 30 percent
Rock outcrop: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Ashe

Surface layer:
0 to 5 inches—very dark gray sandy loam
5 to 7 inches—very dark grayish brown gravelly fine sandy loam

Subsoil:
7 to 23 inches—dark yellowish brown gravelly sandy loam
23 to 29 inches—yellowish brown gravelly sandy loam

Bedrock:
29 to 34 inches—weathered biotite gneiss
34 to 80 inches—unweathered, hard biotite gneiss

Cleveland

Surface layer:
0 to 3 inches—very dark grayish brown sandy loam
3 to 5 inches—dark yellowish brown sandy loam

Subsoil:
5 to 17 inches—dark yellowish brown sandy loam

Bedrock:
17 to 81 inches—unweathered, hard granitic gneiss

Rock outcrop

The Rock outcrop is dominantly granite and biotite gneiss bedrock.

Properties and Qualities of the Ashe and Cleveland Soils

Depth class: Ashe—moderately deep; Cleveland—shallow
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Ashe—low; Cleveland—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None

Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Ashe—medium; Cleveland—high
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Ashe—20 to 40 inches to hard bedrock; Cleveland—10 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contact; soil slippage potential when soil is saturated or when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of Buladean and Edneyville soils that have soft bedrock at a depth of 40 to more than 60 inches
- Soils that have hard bedrock at a depth of 1 to 10 inches; adjacent to rock outcrops
- Toecane and Tusquitee soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways, below rock outcrops, and on benches and toeslopes
- Random areas of soils that have more mica in the subsoil and have hard bedrock at a depth of more than 40 inches
- Random areas of soils on less than 50 percent or greater than 95 percent slopes
- Areas of rubble land; below rock outcrops and in drainageways
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Ashe and Cleveland soils that have coarse sandy loam, fine sandy loam, and loam surface layers
- Random areas of Chestnut soils that have soft bedrock at a depth of 20 to 40 inches

Land Use

Dominant Uses: Wildlife habitat and woodland

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, low volume, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tanks because of the slope, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops and very bouldery surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Ashe and Cleveland—7s; Rock outcrop—8s

BaD—Balsam-Tanasee complex, 15 to 30 percent slopes, extremely bouldery

Setting

Landscape: High mountains in the northeastern part of the survey area, near Craggy Gardens, and in the southwestern part, near Mt. Pisgah
Elevation range: 4,600 to 6,000 feet
Landform: Coves, drainageways, and colluvial fans
Landform position: Head slopes, footslopes, and toeslopes
Shape of areas: Irregular or long and narrow
Size of areas: Up to 39 acres

Composition

Balsam soil and similar inclusions: 60 percent
Tanasee soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Balsam

Surface layer:
0 to 5 inches—black cobbly loam
5 to 11 inches—very dark brown cobbly loam

Subsoil:
11 to 21 inches—dark brown very cobbly fine sandy loam
21 to 43 inches—dark yellowish brown very cobbly loam

Underlying material:
43 to 80 inches—strong brown and dark yellowish brown very cobbly sandy loam

Tanasee

Surface layer:
0 to 9 inches—very dark brown loam
9 to 15 inches—very dark grayish brown loam

Subsoil:
15 to 29 inches—dark yellowish brown cobbly fine sandy loam
29 to 42 inches—yellowish brown cobbly sandy loam
42 to 56 inches—yellowish brown gravelly sandy loam

Underlying material:
56 to 75 inches—dark yellowish brown cobbly loamy coarse sand saprolite
75 to 83 inches—loamy sand saprolite in mixed shades of brown, yellow, and gray

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Balsam—loamy with many rock fragments; Tanasee—loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep

Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 15 percent stones and boulders that average about 10 to 48 inches in diameter and 3 to 10 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high rainfall, and a short growing season
Soil reaction: Balsam—extremely acid to moderately acid throughout the profile; Tanasee—extremely acid to strongly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic rock on the Pisgah and Craggy Mountains
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; high content of rock fragments in the Balsam soil

Minor Components

Dissimilar inclusions:
- Areas of rubble land; in drainageways and below rock outcrops
- Random areas of soils that are similar to the Tanasee soil but have more clay in the subsoil
- Burton soils that have hard bedrock at a depth of 20 to 40 inches; along the outer edge of map unit delineations
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways
- Unprotected areas that are windswept

Similar inclusions:
- Balsam soils that have surface layers of loamy sand, loamy coarse sand, coarse sandy loam, or fine sandy loam
- Tanasee soils that have surface layers of sandy loam or fine sandy loam

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, extremely bouldery surface, and short growing season. A site on better suited soils should be selected.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the extremely bouldery surface and short growing season. A site on better suited soils should be selected.

Orchards and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchards and ornamental crops because of the extremely bouldery surface and short growing season. A site on better suited soils should be selected.

Woodland Management and Productivity

Potential for commercial species: Not used
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the extremely bouldery surface, short growing season, and low productivity. A site on better suited soils should be selected.

Urban Development

Dwellings

Suitability: Balsam—unsuited; Tanasee—poorly suited
Management concerns:
- This map unit is not managed for dwellings.

Septic tank absorption fields

Suitability: Balsam—unsuited; Tanasee—poorly suited
Management concerns:
- This map unit is not managed for septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Balsam—slope, erodibility, large stones, seeps and springs, frost action, and differential settling; Tanasee—slope, erodibility, large stones, seeps and springs, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Large stones and boulders will be encountered during excavation.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Permanently surfacing roads or using suitable subgrade or base material allows year-round use and helps to minimize damage from frost heaving.
- The Balsam soil is subject to uneven settling and may be unstable if not properly compacted.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads so that they conform to the natural slope help to improve soil strength.

Lawns and landscaping

Suitability: Poorly suited
Management concerns:
- This map unit is not managed for lawns and landscaping.

Interpretive Groups

Land capability classification: Balsam—7s; Tanasee—6s

BaE—Balsam-Tanasee complex, 30 to 50 percent slopes, extremely bouldery

Setting

Landscape: High mountains in the northeastern part of the survey area, near Craggy Gardens, and in the southwestern part, near Mt. Pisgah
Elevation range: 4,600 to 6,000 feet
Landform: Coves, drainageways, and colluvial fans
Landform position: Head slopes, footslopes, and toeslopes
Shape of areas: Irregular or long and narrow
Size of areas: Up to 72 acres

Composition

Balsam soil and similar inclusions: 60 percent
Tanasee soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Balsam

Surface layer:
0 to 5 inches—black cobbly loam
5 to 11 inches—very dark brown cobbly loam

Subsoil:
11 to 21 inches—dark brown very cobbly fine sandy loam
21 to 43 inches—dark yellowish brown very cobbly loam

Underlying material:
43 to 80 inches—strong brown and dark yellowish brown very cobbly sandy loam

Tanasee

Surface layer:
0 to 9 inches—very dark brown loam
9 to 15 inches—very dark grayish brown loam

Subsoil:
15 to 29 inches—dark yellowish brown cobbly fine sandy loam
29 to 42 inches—yellowish brown cobbly sandy loam
42 to 56 inches—yellowish brown gravelly sandy loam

Underlying material:
56 to 75 inches—dark yellowish brown cobbly loamy coarse sand saprolite
75 to 83 inches—loamy sand saprolite in mixed shades of brown, yellow, and gray

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Balsam—loamy with many rock fragments; Tanasee—loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep

Soil slippage potential: Balsam—medium; Tanasee—low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 15 percent stones and boulders that average about 10 to 48 inches in diameter and 3 to 10 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high rainfall, and a short growing season
Soil reaction: Balsam—extremely acid to moderately acid throughout the profile; Tanasee—extremely acid to strongly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic rock on the Pisgah and Craggy Mountains
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; high content of rock fragments in the Balsam soil; soil slippage potential when soil is saturated

Minor Components

Dissimilar inclusions:
- Areas of rubble land; in drainageways and below rock outcrops
- Random areas of soils that are similar to the Tanasee soil but have more clay in the subsoil
- Burton soils that have hard bedrock at a depth of 20 to 40 inches; along the outer edge of map unit delineations
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways
- Unprotected areas that are windswept

Similar inclusions:
- Balsam soils that have surface layers of loamy sand, loamy coarse sand, coarse sandy loam, or fine sandy loam
- Tanasee soils that have surface layers of sandy loam or fine sandy loam

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, extremely bouldery surface, and short growing season. A site on better suited soils should be selected.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the extremely bouldery surface and short growing season. A site on better suited soils should be selected.

Orchards and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchards and ornamental crops because of the extremely bouldery surface and short growing season. A site on better suited soils should be selected.

Woodland Management and Productivity

Potential for commercial species: Not used
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the extremely bouldery surface, short growing season, and low productivity. A site on better suited soils should be selected.

Urban Development

Dwellings

Suitability: Balsam—unsuited; Tanasee—poorly suited
Management concerns:
- This map unit is not managed for dwellings.

Septic tank absorption fields

Suitability: Balsam—unsuited; Tanasee—poorly suited
Management concerns:
- This map unit is not managed for septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Balsam—slope, erodibility, large stones, seeps and springs, frost action, and differential settling; Tanasee—slope, erodibility, large stones, seeps and springs, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-based dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Large stones and boulders will be encountered during excavation.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Permanently surfacing roads or using suitable subgrade or base material allows year-round use and helps to minimize damage from frost heaving.
- The Balsam soil is subject to uneven settling and may be unstable if not properly compacted.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads so that they conform to the natural slope help to improve soil strength.

Lawns and landscaping

Suitability: Poorly suited
Management concerns:
- This map unit is not managed for lawns and landscaping.

Interpretive Groups

Land capability classification: 7s

BeA—Biltmore loamy sand, 0 to 3 percent slopes, occasionally flooded

Setting

Landscape: Mountains valleys of intermountain hills; low and intermediate mountains, dominantly along Cane, Hominy, Reems, and Newfound Creeks and the French Broad and Swannanoa Rivers
Elevation range: 1,700 to 2,300 feet
Landform: Flood plains
Landform position: Planar to slightly convex bottomland slopes
Shape of areas: Long and narrow
Size of areas: Up to 19 acres

Composition

Biltmore soil and similar inclusions: 90 percent
Dissimilar inclusions: 10 percent

Typical Profile

Surface layer:
0 to 8 inches—dark yellowish brown loamy sand

Underlying material:
8 to 80 inches—dark yellowish brown sand that has mottles in shades of brown

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Sandy
Permeability: Rapid
Available water capacity: Very low
Depth to seasonal high water table: 3.5 to 6.0 feet from December through May and 4.0 to 6.5 feet from June through November
Hazard of flooding: Occasional, throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: Low
Potential frost action: Low
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Strongly acid to slightly alkaline throughout the profile
Parent material: Recent sandy alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Soil subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:
- Soils that have a frequent flood hazard; on low-lying landscapes

- Rosman soils that have loamy subsoils and an occasional flood hazard; in the slightly higher-lying positions
- Iotla soils that are somewhat poorly drained; in depressions and old stream channels
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and 8 to 40 inches to strata with a high content of rock fragments; along stream channels
- Areas of soils on greater than 3 percent slopes; along stream channels and on toeslopes
- Soils that are moderately well drained to poorly drained; in depressions, old stream channels, and backwater areas

Similar inclusions:
- Biltmore soils that have sandy loam and loam surface layers

Land Use

Dominant Uses: Woodland, wildlife habitat, and recreation
Other Uses: Pasture and hayland

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns: Flooding, droughtiness, soil fertility, nutrient leaching, climate, and equipment use
Management measures and considerations:
- Because of the potential for flooding during the growing season, this soil is difficult to manage for cropland.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Flooding, droughtiness, soil fertility, and nutrient leaching
Management measures and considerations:
- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- Using drought-tolerant plants helps to increase productivity.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications helps to increase the effectiveness of lime, fertilizer, and pesticides.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of frequent flooding. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods

Suitability: Poorly suited
Management concerns: Flooding and seedling survival
Management measures and considerations:
- This soil may be difficult to manage for timber production because of the hazard of frequent flooding.
- The potential for flooding is a consideration in the placement of haul roads and log landings.
- Planting the appropriate species, as recommended by a forester, helps to achieve maximum productivity and helps to ensure planting success.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of flooding. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the flooding and poor filtering capacity. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Flooding, high sand content, droughtiness, soil fertility, nutrient leaching, and climate
Management measures and considerations:
- Flooding makes this soil difficult to manage.
- Quick and permanent establishment of ground cover helps to stabilize the soil and improves trafficability.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Using split applications helps to increase the effectiveness of lime, fertilizer, and pesticides.
- Using frequent and light applications of irrigation water helps to avoid the leaching of plant nutrients and pesticides below the rooting zone.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: 3s

BkB2—Braddock clay loam, 2 to 8 percent slopes, moderately eroded

Setting

Landscape: Mountain valleys of low mountains and intermountain hills in the south-central and southeastern parts of the county
Elevation range: 1,900 to 2,400 feet
Landform: High stream terraces
Landform position: Benches
Shape of areas: Long and narrow or irregular
Size of areas: Up to 38 acres

Composition

Braddock soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 9 inches—dark brown clay loam

Subsoil:
9 to 15 inches—yellowish red clay loam
15 to 54 inches—red clay
54 to 71 inches—red sandy clay loam

Underlying material:
71 to 83 inches—red sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Unison soils that have thicker surface layers with more organic matter and have a browner subsoil; in concave areas
- Statler soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas
- Moderately well drained to poorly drained soils; in depressions and on toeslopes
- Tate soils that are well drained, are brown, and have less clay in the subsoil; in depressions and on toeslopes at colluvial and high terrace interfaces
- Somewhat poorly drained French soils that are loamy in the upper part and 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Random areas of soils on greater than 8 percent slopes
- Udorthents, loamy, in and around Asheville, Weaverville, Black Mountain, and other densely populated areas along stream channels
- Udorthents-Urban land in and around Asheville, Weaverville, Black Mountain, and other densely populated areas along stream channels

Similar inclusions:
- Braddock soils that have loam and sandy clay loam surface layers

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:
- Using resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations which include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, root penetration, pesticide retention, and soil fertility
Management measures and considerations:
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Well suited to orchards; suited to ornamentals
Management concerns: Erodibility, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderately high for cove hardwoods
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Well suited
Management concerns: Erodibility, high clay content, shrink-swell potential, corrosivity, seeps and springs, and large stones
Management measures and considerations:
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Large stones may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.

- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones may be encountered during excavation.

Local roads and streets

Suitability: Well suited
Management concerns: Low strength, high clay content, erodibility, frost action, and seeps and springs
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: 2e

BkC2—Braddock clay loam, 8 to 15 percent slopes, moderately eroded

Setting

Landscape: Mountain valleys of low mountains and intermountain hills, dominantly in the south-central and southeastern parts of the county
Elevation range: 1,900 to 2,400 feet
Landform: High stream terraces
Landform position: Benches
Shape of areas: Irregular
Size of areas: Up to 52 acres

Composition

Braddock soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 9 inches—dark brown clay loam

Subsoil:
9 to 15 inches—yellowish red clay loam
15 to 54 inches—red clay
54 to 71 inches—red sandy clay loam

Underlying material:
71 to 83 inches—red sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Moderate or high

Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Unison soils that have thicker surface layers with more organic matter and have a browner subsoil; in concave areas
- Statler soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas
- Moderately well drained to poorly drained soils; in depressions and on toeslopes
- Tate soils which are well drained, are brown, and have less clay in the subsoil; in depressions and on toeslopes at colluvial and high terrace interfaces
- Somewhat poorly drained French soils that are loamy in the upper part and 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Random areas of soils with less than 8 percent or greater than 15 percent slopes
- Udorthents, loamy, in and around Asheville, Weaverville, Black Mountain, and other densely populated areas along stream channels
- Udorthents-Urban land in and around Asheville, Weaverville, Black Mountain, and other densely populated areas along stream channels

Similar inclusions:
- Braddock soils that have loam and sandy clay loam surface layers

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, equipment use, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.

- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, equipment use, root penetration, pesticide retention, and soil fertility
Management measures and considerations:
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Well suited to orchards; suited to ornamentals
Management concerns: Erodibility, equipment use, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.

- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderately high for cove hardwoods
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Erodibility, slope, shrink-swell potential, high clay content, corrosivity, seeps and springs, and large stones
Management measures and considerations:
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Designing structures to conform with natural slopes helps to improve soil performance.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.

- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, slope, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, high clay content, slope, erodibility, frost action, and seeps and springs
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, slope, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.

- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: 3e

BkD2—Braddock clay loam, 15 to 30 percent slopes, moderately eroded

Setting

Landscape: Mountain valleys of low mountains and intermountain hills, dominantly in the south-central and southeastern parts of the county
Elevation range: 1,900 to 2,400 feet
Landform: High stream terraces
Landform position: Benches
Shape of areas: Irregular
Size of areas: Up to 48 acres

Composition

Braddock soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 9 inches—dark brown clay loam

Subsoil:
9 to 15 inches—yellowish red clay loam
15 to 54 inches—red clay
54 to 71 inches—red sandy clay loam

Underlying material:
71 to 83 inches—red sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey

Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Unison soils that have thicker surface layers with more organic matter and have a browner subsoil; in concave areas
- Statler soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas
- Moderately well drained to poorly drained soils in depressions and on toeslopes
- Tate soils which are well drained, are brown, and have less clay in the subsoil; in depressions and on toeslopes at colluvial and high terrace interfaces
- Somewhat poorly drained French soils that are loamy in the upper part and 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Random areas of soils on less than 8 percent slopes
- Udorthents, loamy, in and around Asheville, Weaverville, Black Mountain, and other densely populated areas along stream channels
- Udorthents-Urban land in and around Asheville, Weaverville, Black Mountain, and other densely populated areas along stream channels

Similar inclusions:
- Braddock soils that have loam and sandy clay loam surface layers

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland and building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:
- This soil is difficult to manage for cultivated crops because the slope limits equipment use.

- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Suited
Management concerns: Equipment use, erodibility, root penetration, pesticide retention, and soil fertility
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Suited
Management concerns: Equipment use, erodibility, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility
Management measures and considerations:
- This soil may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.

- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderately high for cove hardwoods
Suitability: Suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, shrink-swell potential, high clay content, corrosivity, seeps and springs, and large stones
Management measures and considerations:
- Designing structures so that they conform to natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, restricted permeability, high clay content, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, high clay content, slope, erodibility, frost action, and seeps and springs
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Poorly suited

Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility

Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: 4e

BnB—Braddock-Urban land complex, 2 to 8 percent slopes

Setting

Landscape: Mountain valleys of low mountains and intermountain hills, dominantly in the south-central and southeastern parts of the county
Elevation range: 1,900 to 2,400 feet
Landform: High stream terraces
Landform position: Benches
Shape of areas: Long and narrow or irregular
Size of areas: Up to 47 acres

Composition

Braddock soil and similar inclusions: 50 percent
Urban land: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Braddock

Surface layer:
0 to 9 inches—dark brown clay loam

Subsoil:
9 to 15 inches—yellowish red clay loam
15 to 54 inches—red clay
54 to 71 inches—red sandy clay loam

Underlying material:
71 to 83 inches—red sandy loam

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Braddock Soil

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Udorthents, loamy, in and around Asheville, Weaverville, Black Mountain, and other densely populated areas along stream channels
- Udorthents-Urban land in and around Asheville, Weaverville, Black Mountain, and other densely populated areas along stream channels
- Random areas of short, steep slopes
- Moderately well drained to poorly drained soils in depressions and on toeslopes
- Areas that are subject to occasional or rare flooding for very brief duration; adjacent to stream channels

- Random areas of soils that have less clay in the subsoil and soft bedrock at a depth of 20 to more than 60 inches
- Random areas of soils that have less clay and more mica in the subsoil
- Random areas of moderately well drained to poorly drained soils that have 20 to more than 40 inches of loamy material over strata with high contents of sand and rock fragments; along stream channels
- Random areas of soils that are similar to Clifton soils and have soft bedrock at a depth of 40 to more than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on greater than 8 percent slopes

Similar inclusions:
- Braddock soils that have loam and sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral

Land Use

Dominant Uses: Building site development

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Well suited
Management concerns: Erodibility, high clay content, shrink-swell potential, corrosivity, seeps and springs, and large stones
Management measures and considerations:
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of the Braddock soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.

- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Large stones may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones may be encountered during excavation.

Local roads and streets

Suitability: Well suited
Management concerns: Low strength, high clay content, erodibility, frost action, and seeps and springs
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The Braddock soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of the Braddock soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of

the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: Braddock—2e; Urban land—8

BnC—Braddock-Urban land complex, 8 to 15 percent slopes

Setting

Landscape: Mountain valleys of low mountains and intermountain hills, dominantly in the south-central and southeastern parts of the county
Elevation range: 1,900 to 2,400 feet
Landform: High stream terraces
Landform position: Benches
Shape of areas: Long and narrow or irregular
Size of areas: Up to 22 acres

Composition

Braddock soil and similar inclusions: 50 percent
Urban land: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Braddock

Surface layer:
0 to 9 inches—dark brown clay loam

Subsoil:
9 to 15 inches—yellowish red clay loam
15 to 54 inches—red clay
54 to 71 inches—red sandy clay loam

Underlying material:
71 to 83 inches—red sandy loam

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process

of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Braddock Soil

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:

- Udorthents, loamy, in and around Asheville, Weaverville, Black Mountain, and other densely populated areas along stream channels
- Udorthents-Urban land in and around Asheville, Weaverville, Black Mountain, and other densely populated areas along stream channels
- Random areas of short, steep slopes
- Moderately well drained to poorly drained soils in depressions and on toeslopes
- Areas that are subject to occasional or rare flooding for very brief duration; adjacent to stream channels
- Random areas of soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of soils that have less clay and more mica in the subsoil
- Random areas of moderately well drained to poorly drained soils that have 20 to more than 40 inches of loamy material over strata with high contents of sand and rock fragments; along stream channels
- Random areas of soils that are similar to Clifton soils and have soft bedrock at a depth of 40 to more than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Braddock soils that have loam and sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral

Land Use

Dominant Uses: Building site development

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, shrink-swell potential, corrosivity, seeps and springs, and large stones
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of the Braddock soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Large stones may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, slope, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.

- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones may be encountered during excavation.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, high clay content, slope, erodibility, frost action, and seeps and springs
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The Braddock soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of the Braddock soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.

- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: Braddock—3e; Urban land—8

BpF—Breakneck-Pullback complex, windswept, 50 to 95 percent slopes, very rocky

Setting

Landscape: High mountains in the northwestern part of the county on Sandymush Bald
Elevation range: 4,500 to 5,100 feet
Landform: Mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: 9 acres

Composition

Breakneck soil and similar inclusions: 60 percent
Pullback soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Breakneck

Surface layer:
0 to 9 inches—black channery loam

Subsoil:
9 to 25 inches—dark yellowish brown channery loam

Bedrock:
25 to 80 inches—unweathered, hard metasandstone

Pullback

Surface layer:
0 to 7 inches—very dark brown sandy loam

Subsoil:
7 to 15 inches—dark yellowish brown sandy loam

Bedrock:
15 to 80 inches—unweathered, hard metasandstone

Soil Properties and Qualities

Depth class: Breakneck—moderately deep; Pullback—shallow
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate or moderately rapid

Available water capacity: Breakneck—low; Pullback—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Breakneck—medium; Pullback—high
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Extent of rock outcrop: About 7 percent on the soil surface
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rocks, such as metasandstone and phyllite
Depth to bedrock: Breakneck—20 to 40 inches; Pullback—10 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; soils subject to downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of less than 10 or greater than 40 inches; adjacent to rock outcrops
- Soils that have more rock fragments in the subsoil; below rock outcrops and in drainageways
- Soils that have loamy subsoils and bedrock at a depth of more than 60 inches; in concave areas at the head of drains, in drainageways, and on benches and footslopes
- Random areas of soils on less than 50 percent or greater than 95 percent slopes

Similar inclusions:
- Breakneck soils that have fine sandy loam and sandy loam surface layers
- Pullback soils that have fine sandy loam and sandy loam surface layers
- Random areas of similar soils that have bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, short growing season, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, damaging high winds, short growing season, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, damaging high winds, short growing season, erodibility, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of damaging high winds, a short growing season, low productivity, depth to bedrock, and the very bouldery surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, damaging high winds, prolonged freezing temperatures, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope, prolonged freezing temperatures, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, damaging high winds, short growing season, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7s

BwD—Burton-Craggey complex, windswept, 15 to 30 percent slopes, rocky

Setting

Landscape: High mountains in the northeastern part of the survey area, near Craggy Gardens, and in the southwestern part, near Mt. Pisgah
Elevation range: 4,700 to 6,300 feet
Landform: Ridges and mountain slopes
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: Up to 33 acres

Composition

Burton soil and similar inclusions: 50 percent
Craggey soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Burton

Surface layer:
0 to 9 inches—very dark brown sandy clay loam
9 to 17 inches—very dark grayish brown fine sandy loam

Subsoil:
17 to 26 inches—dark yellowish brown sandy loam

Bedrock:
26 to 29 inches—weathered, strongly cemented metagraywacke
29 to 81 inches—unweathered, hard metagraywacke

Craggey

Surface layer:
0 to 8 inches—very dark brown loam
8 to 14 inches—very dark grayish brown sandy loam

Bedrock:
14 to 80 inches—unweathered, hard metagraywacke

Soil Properties and Qualities

Depth class: Burton—moderately deep; Craggey—shallow
Drainage class: Burton—well drained; Craggey—somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Burton—low; Craggey—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart

Extent of rock outcrop: About 2 percent on the soil surface
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Burton—20 to 40 inches to hard bedrock; Craggey—10 to 20 inches to hard bedrock
Other distinctive properties: Random areas of seeps and springs; water movement along bedrock contact

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 1 to 10 inches; adjacent to rock outcrops
- Random areas of soils that have hard bedrock at a depth of 40 to more than 60 inches
- Random areas of soils that have more mica in the subsoil and have hard bedrock at a depth of more than 40 inches
- Soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, in saddles, and in gaps
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Burton and Craggey soils that have coarse sandy loam, fine sandy loam, and loam surface layers
- Random areas of Burton soils that have soft bedrock at a depth of 20 to 40 inches

Land Use

Dominant Uses: Wildlife habitat and recreation
Other Uses: Pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, short growing season, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- This map unit is limited for pasture and hayland because of the slope, erodibility, bouldery surface, damaging high winds, and short growing season. A site should be selected on better suited soils.
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high

content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep and shallow rooting depth, these soils are difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of damaging high winds, a short growing season, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of damaging high winds, a short growing season, slope, erodibility, low productivity, low volume, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tanks because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Burton—6s; Craggey—7s;

BxE—Burton-Craggey-Rock outcrop complex, windswept, 30 to 50 percent slopes, very bouldery

Setting

Landscape: High mountains in the northeastern part of the survey area, near Craggy Gardens, and in the southwestern part, near Mt. Pisgah
Elevation range: 4,700 to 6,300 feet
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 67 acres

Composition

Burton soil and similar inclusions: 40 percent
Craggey soil and similar inclusions: 30 percent
Rock outcrop: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Burton

Surface layer:
0 to 9 inches—very dark brown sandy clay loam
9 to 17 inches—very dark grayish brown fine sandy loam

Subsoil:
17 to 26 inches—dark yellowish brown sandy loam

Bedrock:
26 to 29 inches—weathered, strongly cemented metagraywacke
29 to 81 inches—unweathered, hard metagraywacke

Craggey

Surface layer:
0 to 8 inches—very dark brown loam
8 to 14 inches—very dark grayish brown sandy loam

Bedrock:
14 to 80 inches—unweathered, hard metagraywacke

Rock outcrop

The Rock outcrop is dominantly metagraywacke, biotite, and hornblende gneiss bedrock.

Properties and Qualities of the Burton and Craggey Soils

Depth class: Burton—moderately deep; Craggey—shallow
Drainage class: Burton—well drained; Craggey—somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Burton—low; Craggey—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Burton—medium; Craggey—high
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Burton—20 to 40 inches; Craggey—10 to 20 inches to hard bedrock
Other distinctive properties: Random areas of seeps and springs; water movement along bedrock contact; soil slippage potential when soil is saturated or when lateral support is removed; soils subject to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 1 to 10 inches; adjacent to rock outcrops
- Soils that have more rock fragments in the subsoil; below rock outcrops and in drainageways
- Random areas of soils that have hard bedrock at a depth of 40 to more than 60 inches
- Random areas of soils that have more mica in the subsoil and have hard bedrock at a depth of more than 40 inches
- Soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, in saddles, and in gaps
- Random areas of soils on less than 30 percent or greater than 50 percent slopes

Similar inclusions:
- Burton and Craggey soils that have coarse sandy loam, fine sandy loam, and loam surface layers
- Random areas of Burton soils that have soft bedrock at a depth of 20 to 40 inches

Land Use

Dominant Uses: Wildlife habitat and recreation

Agricultural Development

Cropland

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, short growing season, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for pasture and hayland because of the slope, erodibility, a short growing season, damaging high winds, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of damaging high winds, a short growing season, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of damaging high winds, a short growing season, slope, erodibility, low productivity, low volume, depth to bedrock, extent of rock outcrops, and the very bouldery surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tanks because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Burton and Craggey—7s; Rock outcrop—8s

BxF—Burton-Craggey-Rock outcrop complex, windswept, 50 to 95 percent slopes, very bouldery

Setting

Landscape: High mountains in the northeastern part of the survey area, near Craggy Gardens, and in the southwestern part, near Mt. Pisgah
Elevation range: 4,700 to 6,300 feet
Landform: Mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 125 acres

Composition

Burton soil and similar inclusions: 40 percent
Craggey soil and similar inclusions: 30 percent
Rock outcrop: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Burton

Surface layer:
0 to 9 inches—very dark brown sandy clay loam
9 to 17 inches—very dark grayish brown fine sandy loam

Subsoil:
17 to 26 inches—dark yellowish brown sandy loam

Bedrock:
26 to 29 inches—weathered, strongly cemented metagraywacke
29 to 81 inches—unweathered, hard metagraywacke

Craggey

Surface layer:
0 to 8 inches—very dark brown loam
8 to 14 inches—very dark grayish brown sandy loam

Bedrock:
14 to 80 inches—unweathered, hard metagraywacke

Rock outcrop

The Rock outcrop is dominantly metagraywacke, biotite, and hornblende gneiss bedrock.

Properties and Qualities of the Burton and Craggey Soils

Depth class: Burton—moderately deep; Craggey—shallow

Drainage class: Burton—well drained; Craggey—somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Burton—low; Craggey—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Burton—medium; Craggey—high
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Burton—20 to 40 inches; Craggey—10 to 20 inches to hard bedrock
Other distinctive properties: Random areas of seeps and springs; water movement along bedrock contact; soil slippage potential when soil is saturated or when lateral support is removed; soils subject to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 1 to 10 inches; adjacent to rock outcrops
- Soils that have more rock fragments in the subsoil; below rock outcrops and in drainageways
- Random areas of soils that have hard bedrock at a depth of 40 to more than 60 inches
- Random areas of soils that have more mica in the subsoil and have hard bedrock at a depth of more than 40 inches
- Soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, in saddles, and in gaps
- Random areas of soils on less than 50 percent or greater than 95 percent slopes

Similar inclusions:
- Burton and Craggey soils that have coarse sandy loam, fine sandy loam, and loam surface layers
- Random areas of Burton soils that have soft bedrock at a depth of 20 to 40 inches

Land Use

Dominant Uses: Wildlife habitat and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility,

damaging high winds, short growing season, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, damaging high winds, short growing season, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, damaging high winds, short growing season, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the slope, erodibility, damaging high winds, short growing season, low productivity, low volume, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, damaging high winds, prolonged freezing temperatures, corrosivity, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tanks because of the slope, erodibility, prolonged freezing temperatures, corrosivity, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, prolonged freezing temperatures, corrosivity, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, damaging high winds, prolonged freezing temperatures, corrosivity, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Burton and Craggey—7s; Rock outcrop—8s

CaE—Cataska-Sylco complex, 30 to 50 percent slopes, very rocky

Setting

Landscape: Low and intermediate mountains in the south-central and southeastern parts of the county
Elevation range: 2,200 to 4,800 feet
Landform: South- to west-facing mountain slopes
Landform position: Summit and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 33 acres

Composition

Cataska soil and similar inclusions: 50 percent
Sylco soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Cataska

Surface layer:
0 to 4 inches—yellowish brown channery silt loam

Subsoil:
4 to 12 inches—light yellowish brown very channery silt loam

Bedrock:
12 to 28 inches—weathered slate
28 to 80 inches—unweathered, hard slate

Sylco

Surface layer:
0 to 5 inches—dark yellowish brown channery loam

Subsoil:
5 to 23 inches—strong brown very channery loam

Bedrock:
23 to 80 inches—unweathered, hard phyllite

Soil Properties and Qualities

Depth class: Cataska—shallow; Sylco—moderately deep
Drainage class: Cataska—excessively drained; Sylco—somewhat excessively drained
General texture class: Loamy with many rock fragments
Permeability: Cataska—moderately rapid or rapid; Sylco—moderately rapid
Available water capacity: Low

Figure 11.—Low-grade metasedimentary rock underlies soils such as Sylco and Cataska. This bedrock is unstable when lateral support is removed during the construction of roads.

Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Medium
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Extent of rock outcrop: About 7 percent on the soil surface
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: 20 to 40 inches to hard bedrock (fig. 11)
Other distinctive properties: Soils subject to downslope movement when lateral

support is removed and to differential settling when used as fill material; soils have a high content of rock fragments; water movement along bedrock contacts

Minor Components

Dissimilar inclusions:
- Soco and Stecoah soils that have soft bedrock at a depth of 20 to 60 inches; on spur ridges
- Northcove and Maymead soils that have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Junaluska soils that have more clay in the subsoil and have soft bedrock at a depth of 20 to 40 inches; on spur ridges
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Random areas of soils that have hard bedrock at a depth of less than 10 inches
- Areas of rubble land; below rock outcrops and in drainageways
- Random areas where landslides have occurred

Similar inclusions:
- Cataska soils that have loam surface layers
- Sylco soils that have silt loam surface layers

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the slope, low productivity, low volume, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tanks because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, high content of rock fragments, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7s

CdF—Cataska-Sylco-Rock outcrop complex, 50 to 95 percent slopes, very stony

Setting

Landscape: Low and intermediate mountains in the south-central and southeastern parts of the county
Elevation range: 2,200 to 5,000 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 45 acres

Composition

Cataska soil and similar inclusions: 40 percent
Sylco soil and similar inclusions: 30 percent
Rock outcrop: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Cataska

Surface layer:
0 to 4 inches—yellowish brown channery silt loam

Subsoil:
4 to 12 inches—light yellowish brown very channery silt loam

Bedrock:
12 to 28 inches—weathered slate
28 to 80 inches—unweathered, hard slate

Sylco

Surface layer:
0 to 5 inches—dark yellowish brown channery loam

Subsoil:
5 to 23 inches—strong brown very channery loam

Bedrock:
23 to 80 inches—unweathered, hard phyllite

Rock outcrop

The Rock outcrop is dominantly slate and phyllite bedrock.

Properties and Qualities of the Cataska and Sylco Soils

Depth class: Cataska—shallow; Sylco—moderately deep
Drainage class: Cataska—excessively drained; Sylco—somewhat excessively drained
General texture class: Loamy with many rock fragments
Permeability: Cataska—moderately rapid or rapid; Sylco—moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: High
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; soils have a high content of rock fragments; water movement along bedrock contacts

Minor Components

Dissimilar inclusions:
- Soco and Stecoah soils that have soft bedrock at a depth of 20 to 60 inches; on spur ridges

- Northcove and Maymead soils that have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Junaluska soils that have more clay in the subsoil and have soft bedrock at a depth of 20 to 40 inches; on spur ridges
- Random areas of soils on less than 50 percent or greater than 95 percent slopes
- Random areas of soils that have hard bedrock at a depth of less than 10 inches
- Areas of rubble land below rock outcrops and in drainageways
- Random areas where landslides have occurred

Similar inclusions:
- Cataska soils that have loam surface layers
- Sylco soils that have silt loam surface layers

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, high content of rock fragments, depth to bedrock, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, high content of rock fragments, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, high content of rock fragments, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the slope, low productivity, low volume, depth to bedrock, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, high content of rock fragments, depth to bedrock, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tanks because of the slope, erodibility, high content of rock fragments, depth to bedrock, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, high content of rock fragments, depth to bedrock, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, high content of rock fragments, extent of rock outcrops, and very stony surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Cataska and Sylco—7s; Rock outcrop—8s

ChD—Cheoah-Jeffrey complex, 15 to 30 percent slopes, stony

Setting

Landscape: Intermediate mountains in the northwest, near Sandymush Bald, and in the southeastern part of the county
Elevation range: 3,000 to 4,900 feet
Landform: North- to east-facing ridges and those shaded by the higher mountains
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: Up to 8 acres

Composition

Cheoah soil and similar inclusions: 55 percent
Jeffrey soil and similar inclusions: 30 percent
Dissimilar inclusions: 15 percent

Typical Profile

Cheoah

Surface layer:
0 to 12 inches—very dark grayish brown fine sandy loam

Subsoil:
12 to 38 inches—strong brown to brown loam
38 to 51 inches—strong brown channery loam

Bedrock:
51 to 80 inches—weathered, interbedded metasandstone and phyllite

Jeffrey

Surface layer:
0 to 8 inches—dark grayish brown loam

Subsoil:
8 to 31 inches—dark yellowish brown channery loam

Bedrock:
31 to 80 inches—unweathered, hard, interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Cheoah—deep; Jeffrey—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Cheoah—moderate; Jeffrey—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, allowing for late spring and early fall frosts, and to higher soil moisture content due to north- to east-facing aspects or shading by the higher mountains
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Cheoah—40 to 60 inches to soft bedrock; Jeffrey—20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts in the Jeffrey soil

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 60 inches
- Ditney and Unicoi soils that have thinner surface layers with less organic matter and have hard bedrock at a depth of 7 to 40 inches; on south- to west-facing shoulder slopes and nose slopes
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Widely scattered areas of rock outcrop; on narrow ridges
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Cheoah soils that have sandy loam and fine sandy loam surface layers
- Jeffrey soils that have fine sandy loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, pasture, and building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, and stony surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Suited
Management concerns: Cheoah—equipment use, erodibility, pesticide retention, soil fertility, and rooting depth; Jeffrey—equipment use, erodibility, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Jeffrey soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Cheoah—suited; Jeffrey—poorly suited
Management concerns: Cheoah—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, and rooting depth; Jeffrey—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture

of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential that late spring frost will damage new growth in some years.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Jeffrey soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Cheoah—erodibility, equipment use, and pesticide retention; Jeffrey—erodibility, equipment use, pesticide retention, and windthrow hazard
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Jeffrey soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Cheoah and Jeffrey—slope, depth to bedrock, erodibility, and corrosivity; Jeffrey—slope, depth to bedrock, and erodibility
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of these soils.
- Vegetating cleared and graded areas as soon as possible or constructing silt fences helps to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock

Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Cheoah soils may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Cheoah—slope, erodibility, pesticide retention, soil fertility, climate, and depth to bedrock; Jeffrey—slope, erodibility, pesticide retention, soil fertility, climate, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- The use of native, winter-hardy landscape plants is recommended.
- Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential that late spring frost will damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Jeffrey soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Groups

Land capability classification: 4e

ChE—Cheoah-Jeffrey complex, 30 to 50 percent slopes, stony

Setting

Landscape: Intermediate mountains in the northwest, near Sandymush Bald, and in the southeastern part of the county
Elevation range: 3,000 to 4,900 feet
Landform: North- to east-facing ridges and mountain slopes and those shaded by the higher mountains
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 19 acres

Composition

Cheoah soil and similar inclusions: 50 percent
Jeffrey soil and similar inclusions: 35 percent
Dissimilar inclusions: 15 percent

Typical Profile

Cheoah

Surface layer:
0 to 12 inches—very dark grayish brown fine sandy loam

Subsoil:
12 to 38 inches—strong brown to brown loam
38 to 51 inches—strong brown channery loam

Bedrock:
51 to 80 inches—weathered, interbedded metasandstone and phyllite

Jeffrey

Surface layer:
0 to 8 inches—dark grayish brown loam

Subsoil:
8 to 31 inches—dark yellowish brown channery loam

Bedrock:
31 to 80 inches—unweathered, hard, interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Cheoah—deep; Jeffrey—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Cheoah—moderate; Jeffrey—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe

Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, allowing for late spring and early fall frosts, and to higher soil moisture content due to north- to east-facing aspects or shading by the higher mountains
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Cheoah—40 to 60 inches to soft bedrock; Jeffrey—20 to 40 inches to hard bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; water movement along bedrock contacts in the Jeffrey soil

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 60 inches
- Ditney and Unicoi soils that have thinner surface layers with less organic matter and have hard bedrock at a depth of 7 to 40 inches; on south- to west-facing shoulder slopes and nose slopes
- Soco and Stecoah soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to 60 inches; on south- to west-facing shoulder slopes and nose slopes
- Maymead and Northcove soils that have thinner surface layers with less organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps, in concave areas at the head of drains, and in drainageways
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Widely scattered areas of rock outcrop
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Cheoah soils that have sandy loam and fine sandy loam surface layers
- Jeffrey soils that have fine sandy loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, pasture, and building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, and stony surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Cheoah—equipment use, erodibility, pesticide retention, soil fertility, and rooting depth; Jeffrey—equipment use, erodibility, pesticide retention, soil fertility, rooting depth, and droughtiness

Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Jeffrey soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Cheoah—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, and rooting depth; Jeffrey—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential that late spring frost will damage new growth in some years.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Jeffrey soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Cheoah—equipment use, erodibility, and pesticide retention; Jeffrey—equipment use, erodibility, pesticide retention, and windthrow hazard

Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Jeffrey soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Cheoah—slope, depth to bedrock, erodibility, and corrosivity; Jeffrey—slope, depth to bedrock, erodibility, and corrosivity
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of these soils.
- Vegetating cleared and graded areas as soon as possible or constructing silt fences helps to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Depth to bedrock and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Locating and using areas of the deeper Cheoah soils may improve the performance of filter fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, frost action, and seeps and springs
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Cheoah—slope, erodibility, pesticide retention, soil fertility, climate, and depth to bedrock; Jeffrey—slope, erodibility, pesticide retention, soil fertility, climate, depth to bedrock, and droughtiness
Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- The use of native, winter-hardy landscape plants is recommended.
- Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential that late spring frost will damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Jeffrey soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Groups

Land capability classification: 6e

ChF—Cheoah-Jeffrey complex, 50 to 95 percent slopes, stony

Setting

Landscape: Intermediate mountains in the northwest, near Sandymush Bald, and in the southeastern part of the county
Elevation range: 3,000 to 4,900 feet
Landform: North- to east-facing mountain slopes and those shaded by the higher mountains
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 24 acres

Composition

Cheoah soil and similar inclusions: 60 percent

Jeffrey soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Cheoah

Surface layer:
0 to 12 inches—very dark grayish brown fine sandy loam

Subsoil:
12 to 38 inches—strong brown to brown loam
38 to 51 inches—strong brown channery loam

Bedrock:
51 to 80 inches—weathered, interbedded metasandstone and phyllite

Jeffrey

Surface layer:
0 to 8 inches—dark grayish brown loam

Subsoil:
8 to 31 inches—dark yellowish brown channery loam

Bedrock:
31 to 80 inches—unweathered, hard, interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Cheoah—deep; Jeffrey—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Cheoah—moderate; Jeffrey—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, allowing for late spring and early fall frosts, and to higher soil moisture content due to north- to east-facing aspects or shading by the higher mountains
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Cheoah—40 to 60 inches to soft bedrock; Jeffrey—20 to 40 inches to hard bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; water movement along bedrock contacts in the Jeffrey soil

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 60 inches
- Ditney and Unicoi soils that have thinner surface layers with less organic matter and have hard bedrock at a depth of 7 to 40 inches; on south- to west-facing shoulder slopes and nose slopes
- Soco and Stecoah soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to 60 inches; on south- to west-facing shoulder slopes and nose slopes
- Maymead and Northcove soils that have thinner surface layers with less organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps, in concave areas at the head of drains, and in drainageways
- Random areas of soils on less than 50 percent or greater than 95 percent slopes
- Widely scattered areas of rock outcrop
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Cheoah soils that have sandy loam and fine sandy loam surface layers
- Jeffrey soils that have fine sandy loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, and stony surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, depth to bedrock, and stony surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, and stony surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Poorly suited
Management concerns: Cheoah—equipment use, erodibility, and pesticide retention; Jeffrey—equipment use, erodibility, pesticide retention, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents

the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Jeffrey soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, and stony surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, and stony surface. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, and stony surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, and stony surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7e

CkB2—Clifton clay loam, 2 to 8 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low mountains of the Asheville Basin in the central and southern parts of the county
Elevation range: 2,000 to 2,400 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow or irregular
Size of areas: Up to 102 acres

Composition

Clifton soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 8 inches—strong brown clay loam

Subsoil:
8 to 42 inches—red clay
42 to 83 inches—yellowish red clay loam

Underlying material:
83 to 101 inches—variegated loam saprolite in shades of red, brown, yellow, and white

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock high in ferro-magnesium minerals
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content

Minor Components

Dissimilar inclusions:
- Random areas of Cowee and Evard soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil
- Random areas of soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Random areas of soils on greater than 8 percent slopes
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of Urban land throughout the southern part of the county
- Random areas of Udorthents, loamy, throughout the southern part of the county

Similar inclusions:
- Clifton soils that have loam and sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral

- Soils which have high base saturation in the lower subsoil; dominantly in the central part of the county

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, equipment use, tilth, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Using resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations which include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Pasture and hayland

Suitability: Well suited
Management concerns: Equipment use, erodibility, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Preparing seedbeds on the contour when renovating pastures and establishing seedbeds helps to prevent further soil erosion and increases germination.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned clipping and harvesting

schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Orchard and ornamental crops

Suitability: Well suited to orchards; poorly suited to ornamental crops
Management concerns: Erodibility, equipment use, root disease, soil fertility, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderate for upland hardwoods
Suitability: Well suited
Management concerns: Erodibility, equipment use, seedling survival, and pesticide retention
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes is difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

- Using improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Well suited
Management concerns: Slope, erodibility, and high clay content
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes is difficult.
- This soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Increasing the size of the septic tank absorption field helps to improve its performance.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Well suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes is difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes is difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the clay content, may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Groups

Land capability classification: 2e

CkC2—Clifton clay loam, 8 to 15 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low mountains of the Asheville Basin in the central and southern parts of the county
Elevation range: 2,000 to 2,400 feet
Landform: Ridges, hillslopes, and mountain slopes
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: Up to 775 acres

Composition

Clifton soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 8 inches—strong brown clay loam

Subsoil:
8 to 42 inches—red clay
42 to 83 inches—yellowish red clay loam

Underlying material:
83 to 101 inches—variegated loam saprolite in shades of red, brown, yellow, and white

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock high in ferro-magnesium minerals
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content

Minor Components

Dissimilar inclusions:
- Random areas of Cowee and Evard soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil
- Random areas of soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas
- Random areas of soils on less than 8 percent or greater than 15 percent slopes
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of Urban land throughout the southern part of the county
- Random areas of Udorthents, loamy, throughout the southern part of the county

Similar inclusions:
- Clifton soils that have loam and sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral
- Soils which have high base saturation in the lower subsoil; dominantly in the central part of the county

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, equipment use, tilth, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, equipment use, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Orchard and ornamental crops

Suitability: Suited to orchards; poorly suited to ornamental crops

Management concerns: Erodibility, equipment use, root disease, soil fertility, pesticide retention, and ball and burlap harvesting

Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderate for upland hardwoods

Suitability: Well suited

Management concerns: Erodibility and equipment use

Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Suited

Management concerns: Erodibility, slope, and high clay content

Management measures and considerations:

- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, slope, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of

the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Groups

Land capability classification: 3e

CkD2—Clifton clay loam, 15 to 30 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low mountains of the Asheville Basin in the central and southern parts of the county
Elevation range: 2,000 to 2,400 feet
Landform: Ridges, hillslopes, and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and oblong or irregular on side slopes
Size of areas: Up to 378 acres

Composition

Clifton soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 8 inches—strong brown clay loam

Subsoil:
8 to 42 inches—red clay
42 to 83 inches—yellowish red clay loam

Underlying material:
83 to 101 inches—variegated loam saprolite in shades of red, brown, yellow, and white

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low

Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock high in ferro-magnesium minerals
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content

Minor Components

Dissimilar inclusions:
- Random areas of Cowee and Evard soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil
- Random areas of soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Tate soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas and drainageways
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Random areas of Urban land throughout the southern part of the county
- Random areas of Udorthents, loamy, throughout the southern part of the county

Similar inclusions:
- Clifton soils that have loam and sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral
- Soils which have high base saturation in the lower subsoil; dominantly in the central part of the county

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Woodland, wildlife habitat, building site development, and cropland

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- This soil is difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.

- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Pasture and hayland

Suitability: Suited
Management concerns: Equipment use, erodibility, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Orchard and ornamental crops

Suitability: Suited to orchards; poorly suited to ornamental crops
Management concerns: Equipment use, erodibility, root disease, soil fertility, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- This soil is difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderate for upland hardwoods
Suitability: Suited
Management concerns: Erodibility and equipment use
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, and high clay content
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, restricted permeability, and high clay content
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.

- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Groups

Land capability classification: 4e

CkE2—Clifton clay loam, 30 to 50 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low mountains of the Asheville Basin in the central and southern parts of the county
Elevation range: 2,000 to 2,400 feet
Landform: Hillslopes and mountain slopes
Landform position: Side slopes
Shape of areas: Oblong or irregular
Size of areas: Up to 104 acres

Composition

Clifton soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 8 inches—strong brown clay loam

Subsoil:
8 to 42 inches—red clay
42 to 83 inches—yellowish red clay loam

Underlying material:
83 to 101 inches—variegated loam saprolite in shades of red, brown, yellow, and white

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock high in ferro-magnesium minerals
Depth to bedrock: More than 60 inches
Other distinctive properties: High clay content; potential for downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of Cowee and Evard soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil
- Random soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Tate soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas at the head of drains and on footslopes
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Random areas of Urban land throughout the southern part of the county
- Random areas of Udorthents, loamy, throughout the southern part of the county

Similar inclusions:
- Clifton soils that have loam and sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral
- Soils which have high base saturation in the lower subsoil; dominantly in the central part of the county

Land Use

Dominant Uses: Pasture, woodland, and wildlife habitat
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Equipment use, erodibility, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Special care should be taken when renovating pastures and establishing seedbeds to prevent further soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, root disease, soil fertility, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- This soil may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderate for upland hardwoods
Suitability: Suited
Management concerns: Equipment use and erodibility
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland or pastureland is converted to woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, and high clay content

Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, restricted permeability, and high clay content
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.

- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Groups

Land capability classification: 6e

CsB—Clifton sandy loam, 2 to 8 percent slopes

Setting

Landscape: Intermountain hills and low mountains of the Asheville Basin in the central and southern parts of the county
Elevation range: 2,000 to 2,400 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow or irregular
Size of areas: Up to 63 acres

Composition

Clifton soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 7 inches—dark yellowish brown sandy loam

Subsoil:
7 to 49 inches—red clay
49 to 67 inches—yellowish red clay loam

Underlying material:
67 to 87 inches—variegated loam saprolite in shades of red, brown, yellow, and white

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None

Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock high in ferro-magnesium minerals
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content

Minor Components

Dissimilar inclusions:
- Random areas of Cowee and Evard soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil
- Random soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Random areas of soils on greater than 8 percent slopes
- Random areas of moderately or severely eroded soils where underlying material is exposed at the surface
- Random areas of Urban land throughout the southern part of the county
- Random areas of Udorthents, loamy, throughout the southern part of the county

Similar inclusions:
- Clifton soils that have loam, clay loam, and sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral
- Soils which have high base saturation in the lower subsoil; dominantly in the central part of the county

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, equipment use, tilth, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Using resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations which include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.

- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Pasture and hayland

Suitability: Well suited
Management concerns: Equipment use, erodibility, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Preparing seedbeds on the contour when renovating pastures and establishing seedbeds helps to prevent further soil erosion and increases germination.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Orchard and ornamental crops

Suitability: Well suited to orchards; poorly suited to ornamental crops
Management concerns: Erodibility, equipment use, root disease, soil fertility, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.

- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderate for upland hardwoods
Suitability: Well suited
Management concerns: Erodibility, equipment use, seedling survival, and pesticide retention
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes is difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Using improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Well suited
Management concerns: Slope, erodibility, and high clay content
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes is difficult.
- This soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.

- Increasing the size of the septic tank absorption field helps to improve its performance.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Well suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes is difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes is difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the clay content, may increase their effectiveness.

- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Groups

Land capability classification: 2e

CsC—Clifton sandy loam, 8 to 15 percent slopes

Setting

Landscape: Intermountain hills and low mountains of the Asheville Basin in the central and southern parts of the county
Elevation range: 2,000 to 2,400 feet
Landform: Ridges, hillslopes, and mountain slopes
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: Up to 94 acres

Composition

Clifton soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 7 inches—dark yellowish brown sandy loam

Subsoil:
7 to 49 inches—red clay
49 to 67 inches—yellowish red clay loam

Underlying material:
67 to 87 inches—variegated loam saprolite in shades of red, brown, yellow, and white

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock high in ferro-magnesium minerals

Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content

Minor Components

Dissimilar inclusions:
- Random areas of Cowee and Evard soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil
- Random soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas
- Random areas of soils on less than 8 percent or greater than 15 percent slopes
- Random areas of moderately or severely eroded soils where underlying material is exposed at the surface
- Random areas of Urban land throughout the southern part of the county
- Random areas of Udorthents, loamy, throughout the southern part of the county

Similar inclusions:
- Clifton soils that have loam, clay loam, and sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral
- Soils which have high base saturation in the lower subsoil; dominantly in the central part of the county

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, equipment use, tilth, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, equipment use, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Orchard and ornamental crops

Suitability: Suited to orchards; poorly suited to ornamental crops
Management concerns: Erodibility, equipment use, root disease, soil fertility, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderate for upland hardwoods
Suitability: Well suited
Management concerns: Erodibility and equipment use

Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Erodibility, slope, and high clay content
Management measures and considerations:
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.

- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, slope, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Groups

Land capability classification: 3e

CsD—Clifton sandy loam, 15 to 30 percent slopes

Setting

Landscape: Intermountain hills and low mountains of the Asheville Basin in the central and southern parts of the county
Elevation range: 2,000 to 2,400 feet
Landform: Ridges, hillslopes, and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and oblong or irregular on side slopes
Size of areas: Up to 76 acres

Composition

Clifton soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 7 inches—dark yellowish brown sandy loam

Subsoil:
7 to 49 inches—red clay
49 to 67 inches—yellowish red clay loam

Underlying material:
67 to 87 inches—variegated loam saprolite in shades of red, brown, yellow, and white

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock high in ferro-magnesium minerals
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content

Minor Components

Dissimilar inclusions:
- Random areas of Cowee and Evard soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil
- Random soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Tate soils that have thicker surface layers with more organic matter and have less clay in the subsoil, in concave areas and drainageways
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Random areas of Urban land throughout the southern part of the county
- Random areas of Udorthents, loamy, throughout the southern part of the county

Similar inclusions:
- Clifton soils that have loam and sandy clay loam surface layers

- Random areas that have reaction in the lower subsoil that ranges to neutral
- Soils which have high base saturation in the lower subsoil; dominantly in the central part of the county

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Woodland, wildlife habitat, building site development, and cropland

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- This soil is difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Pasture and hayland

Suitability: Suited
Management concerns: Equipment use, erodibility, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Orchard and ornamental crops

Suitability: Suited to orchards; poorly suited to ornamental crops
Management concerns: Equipment use, erodibility, root disease, soil fertility, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- This soil is difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Very high for eastern white pine and moderate for upland hardwoods
Suitability: Suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, and high clay content
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, restricted permeability, and high clay content
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control

structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Groups

Land capability classification: 4e

CuB—Clifton-Urban land complex, 2 to 8 percent slopes

Setting

Landscape: Intermountain hills and low mountains of the Asheville Basin in the central and southern parts of the county
Elevation range: 2,000 to 2,400 feet
Landform: Ridges, hillslopes, and coves
Landform position: Summits, side slopes, and footslopes
Shape of areas: Irregular
Size of areas: Up to 115 acres

Composition

Clifton soil and similar inclusions: 50 percent
Urban land: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Clifton

Surface layer:
0 to 8 inches—strong brown clay loam

Subsoil:
8 to 42 inches—red clay
42 to 83 inches—yellowish red clay loam

Underlying material:
83 to 101 inches—variegated loam saprolite in shades of red, brown, yellow, and white

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Clifton Soil

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content

Minor Components

Dissimilar inclusions:
- Random areas of Udorthents, loamy
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas of short, steep slopes
- Random areas of Cowee and Evard soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil
- Random soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on less than 2 percent or greater than 8 percent slopes

Similar inclusions:
- Clifton soils that have sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral
- Soils that have high base saturation in the lower subsoil; dominantly in the central part of the county

Land Use

Dominant Uses: Building site development

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Well suited
Management concerns: Slope, erodibility, and high clay content
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of the Clifton soil, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- This soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Well suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.

- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The Clifton soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of the Clifton soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Groups

Land capability classification: Clifton—2e; Urban land—8

CuC—Clifton-Urban land complex, 8 to 15 percent slopes

Setting

Landscape: Intermountain hills and low mountains of the Asheville Basin in the central and southern parts of the county
Elevation range: 2,000 to 2,400 feet
Landform: Ridges, hillslopes, coves, and flood plains

Landform position: Summits, side slopes, footslopes, toeslopes, and bottomland
Shape of areas: Irregular
Size of areas: Up to 191 acres

Composition

Clifton soil and similar inclusions: 50 percent
Urban land: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Clifton

Surface layer:
0 to 8 inches—strong brown clay loam

Subsoil:
8 to 42 inches—red clay
42 to 83 inches—yellowish red clay loam

Underlying material:
83 to 101 inches—variegated loam saprolite in shades of red, brown, yellow, and white

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Clifton Soil

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content

Minor Components

Dissimilar inclusions:
- Random areas of Udorthents, loamy
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas of short, steep slopes
- Random areas of Cowee and Evard soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil
- Random soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Clifton soils that have sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral
- Soils that have high base saturation in the lower subsoil; dominantly in the central part of the county

Land Use

Dominant Uses: Building site development

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, and high clay content
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of the Clifton soil, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- This soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The Clifton soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of the Clifton soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.

- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Groups

Land capability classification: Clifton—3e; Urban land—8

CuD—Clifton-Urban land complex, 15 to 30 percent slopes

Setting

Landscape: Intermountain hills and low mountains of the Asheville Basin in the central and southern parts of the county
Elevation range: 2,000 to 2,400 feet
Landform: Ridges, hillslopes, coves, and flood plains
Landform position: Summits, side slopes, footslopes, toeslopes, and bottomland
Shape of areas: Irregular
Size of areas: Up to 86 acres

Composition

Clifton soil and similar inclusions: 50 percent
Urban land: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Clifton

Surface layer:
0 to 8 inches—strong brown clay loam

Subsoil:
8 to 42 inches—red clay
42 to 83 inches—yellowish red clay loam

Underlying material:
83 to 101 inches—variegated loam saprolite in shades of red, brown, yellow, and white

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Clifton Soil

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey

Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content

Minor Components

Dissimilar inclusions:
- Random areas of Udorthents, loamy
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas of short, steep slopes
- Random areas of Cowee and Evard soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil
- Random soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Tate soils that have thicker surface layers with more organic matter and have less clay in the subsoil; in concave areas and drainageways
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Clifton soils that have sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral
- Soils that have high base saturation in the lower subsoil; dominantly in the central part of the county

Land Use

Dominant Uses: Building site development
Other Uses: Cropland, pasture, and hayland

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, and high clay content
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of the Clifton soil, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- This soil is slippery and sticky when wet and slow to dry.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Restricted permeability, high clay content, and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The Clifton soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of the Clifton soil, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Interpretive Groups

Land capability classification: Clifton—4e; Urban land—8

CxE—Craggey-Rock outcrop-Clingman complex, windswept, 30 to 50 percent slopes, rubbly

Setting

Landscape: High mountains in the northeastern part of the survey area, near Craggy Gardens, and in the southwestern part, near Mt. Pisgah
Elevation range: 4,800 to 6,400 feet
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow or irregular
Size of areas: Up to 176 acres

Composition

Craggey soil and similar inclusions: 40 percent
Rock outcrop: 30 percent
Clingman soil and similar inclusions: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Craggey

Surface layer:
0 to 8 inches—very dark brown loam
8 to 14 inches—very dark grayish brown sandy loam

Bedrock:
14 to 80 inches—unweathered, hard metagraywacke

Rock outcrop

The Rock outcrop is dominantly metagraywacke, biotite, and hornblende gneiss bedrock.

Clingman

Surface layer:
0 to 7 inches—black peat
7 to 15 inches—very dark brown mucky peat

Subsurface layer:
15 to 19 inches—dark grayish brown loamy sand

Bedrock:
19 to 30 inches—unweathered, slightly fractured metagraywacke

Properties and Qualities of the Craggey and Clingman Soils

Depth class: Craggey—shallow; Clingman—very shallow or shallow
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Craggey—moderately rapid; Clingman—moderately rapid in the organic layers and moderate or moderately rapid in the mineral layers
Available water capacity: Very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: High
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 35 percent stones and boulders that average 10 to 48 inches in diameter and 1 to 3 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Craggey—extremely acid to moderately acid throughout the profile; Clingman—ultra acid or extremely acid in the organic material and extremely acid to strongly acid throughout the rest of the profile
Parent material: Craggey—residuum affected by soil creep, weathered from felsic high-grade metamorphic rock; Clingman—organic deposits underlain by mineral layers, weathered from felsic high-grade metamorphic rock
Depth to bedrock: Craggey—10 to 20 inches to hard bedrock; Clingman—3 to 20 inches to hard bedrock

Other distinctive properties: Water movement along bedrock contact; random areas of seeps and springs; water saturation for short periods during heavy rainfall or snowmelt; soil slippage potential when soil is saturated or when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of Burton soils that have bedrock at a depth of 20 to 40 inches
- Balsam soils that have more rock fragments in the subsoil than the Craggey and Clingman soils; in drainageways and in areas below rock outcrop
- Random areas of Tanasee soils that have bedrock at a depth of more than 60 inches
- Random areas of soils that have a high mica content in the subsoil and underlying material
- Random areas of soils on less than 30 percent or greater than 50 percent slopes

Similar inclusions:
- Craggey soils that have surface layers of coarse sandy loam, sandy loam, or fine sandy loam
- Clingman soils that have a mineral horizon more than 4 inches thick

Land Use

Dominant Uses: Wildlife habitat and recreation
Other Uses: Woodland

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, short growing season, depth to bedrock, extent of rock outcrops, and rubbly surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for pasture and hayland because of the slope, erodibility, short growing season, depth to bedrock, extent of rock outcrops, and rubbly surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of damaging high winds, a short growing season, slope, depth to bedrock, extent of rock outcrops, and the rubbly surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of damaging high winds, a short growing season, slope, erodibility, low productivity, low volume, depth

to bedrock, extent of rock outcrops, and the rubbly surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and rubbly surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tanks because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and rubbly surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and rubbly surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and rubbly surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Craggey and Clingman—7s; Rock outcrop—8s

CxF—Craggey-Rock outcrop-Clingman complex, windswept, 50 to 95 percent slopes, rubbly

Setting

Landscape: High mountains in the northeastern part of the survey area, near Craggy Gardens, and in the southwestern part, near Mt. Pisgah
Elevation range: 4,800 to 6,400 feet
Landform: Mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 135 acres

Composition

Craggey soil and similar inclusions: 40 percent
Rock outcrop: 30 percent
Clingman soil and similar inclusions: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Craggey

Surface layer:
0 to 8 inches—very dark brown loam
8 to 14 inches—very dark grayish brown sandy loam

Bedrock:
14 to 80 inches—unweathered, hard metagraywacke

Rock outcrop

The Rock outcrop is dominantly metagraywacke, biotite, and hornblende gneiss bedrock.

Clingman

Surface layer:
0 to 7 inches—black peat
7 to 15 inches—very dark brown mucky peat

Subsurface layer:
15 to 19 inches—dark grayish brown loamy sand

Bedrock:
19 to 30 inches—unweathered, slightly fractured metagraywacke

Properties and Qualities of the Craggey and Clingman Soils

Depth class: Craggey—shallow; Clingman—very shallow or shallow
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Craggey—moderately rapid; Clingman—moderately rapid in the organic layers and moderate or moderately rapid in the mineral layers
Available water capacity: Very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: High
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 35 percent stones and boulders that average 10 to 48 inches in diameter and 1 to 3 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Craggey—extremely acid to moderately acid throughout the profile; Clingman—ultra acid or extremely acid in the organic material and extremely acid to strongly acid throughout the rest of the profile
Parent material: Craggey—residuum affected by soil creep, weathered from felsic high-grade metamorphic rock; Clingman—organic deposits underlain by mineral layers, weathered from felsic high-grade metamorphic rock
Depth to bedrock: Craggey—10 to 20 inches to hard bedrock; Clingman—3 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contact; random areas of seeps and springs; water saturation for short periods during heavy rainfall or

snowmelt; soil slippage potential when soil is saturated or when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of Burton soils that have bedrock at a depth of 20 to 40 inches
- Balsam soils that have more rock fragments in the subsoil than the Craggey and Clingman soils; in drainageways and in areas below rock outcrop
- Random areas of Tanasee soils that have bedrock at a depth of more than 60 inches
- Random areas of soils that have a high mica content in the subsoil and underlying material
- Random areas of soils on less than 50 percent or greater than 95 percent slopes

Similar inclusions:
- Craggey soils that have surface layers of coarse sandy loam, sandy loam, or fine sandy loam
- Clingman soils that have a mineral horizon more than 4 inches thick

Land Use

Dominant Uses: Wildlife habitat and recreation
Other Uses: Woodland

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, short growing season, depth to bedrock, extent of rock outcrops, and rubbly surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for pasture and hayland because of the slope, erodibility, short growing season, depth to bedrock, extent of rock outcrops, and rubbly surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of damaging high winds, a short growing season, slope, depth to bedrock, extent of rock outcrops, and the rubbly surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of damaging high winds, a short growing season, slope, erodibility, low productivity, low volume, depth to bedrock, extent of rock outcrops, and the rubbly surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and rubbly surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tanks because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and rubbly surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and rubbly surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, climate, corrosivity, depth to bedrock, extent of rock outcrops, and rubbly surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Craggey and Clingman—7s; Rock outcrop—8s

DAM—Dam

This map unit consists of structures built to impound bodies of water. Earthen materials used for the dam core and fill slopes are usually from adjacent areas. No interpretations are given for this map unit.

DeA—Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded

Setting

Landscape: Mountain valleys of low and intermediate mountains throughout the county
Elevation range: 2,100 to 2,800 feet
Landform: Flood plains dominantly at the upper end of mountain valleys
Landform position: Planar to slightly convex bottomland slopes
Shape of areas: Long and narrow
Size of areas: Up to 197 acres

Composition

Dellwood soil and similar inclusions: 60 percent

Reddies soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Dellwood

Surface layer:
0 to 8 inches—very dark grayish brown gravelly fine sandy loam
8 to 16 inches—dark brown extremely gravelly sand

Underlying material:
16 to 80 inches—variegated extremely gravelly coarse sand in shades of brown and yellow

Reddies

Surface layer:
0 to 14 inches—very dark grayish brown sandy loam

Subsoil:
14 to 26 inches—dark yellowish brown fine sandy loam

Underlying material:
26 to 80 inches—variegated very gravelly sand in shades of brown and yellow

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Moderately well drained
General texture class: Dellwood—sandy in the upper part and sandy-skeletal in the lower part; Reddies—loamy in the upper part and sandy or sandy-skeletal in the lower part
Permeability: Dellwood—moderately rapid in the surface horizon and rapid or very rapid in the underlying material; Reddies—moderately rapid in the surface layer and subsoil and rapid or very rapid in the underlying material
Available water capacity: Very low
Depth to seasonal high water table: Dellwood—2.0 to 4.0 feet from December through May and 2.5 to 4.5 feet from June through November; Reddies—2.0 to 3.5 feet from December through May and 2.5 to 4.5 feet from June through November
Hazard of flooding: Occasional, throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: High
Potential frost action: Dellwood—low; Reddies—moderate
Special climatic conditions: Soils subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Depth to contrasting material: Dellwood—8 to 20 inches to deposits of cobbles and

gravel that are stratified with sandy or loamy material; Reddies—20 to 40 inches to deposits of cobbles and gravels that are stratified with sandy or loamy material
Other distinctive properties: Soils subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:
- Soils that are well drained to excessively well drained; in the wider units and those adjacent to deep stream channels
- Soils that have a rare flood hazard; on the wider flood plains
- Somewhat poorly drained French soils and poorly drained Nikwasi soils that have subsoils that are loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; in depressions, old stream channels, and backwater areas
- Well drained Rosman soils that have strata with a high content of rock fragments at a depth of more than 40 inches; in the slightly higher-lying positions
- Moderately well drained Dillard soils that have more clay and less rock fragments in the subsoil; on low stream terraces and toeslopes
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways
- Random areas of soils on greater than 3 percent slopes

Similar inclusions:
- Dellwood and Reddies soils that have sandy loam and loam surface layers

Land Use

Dominant Uses: Cropland and ornamental crops
Other Uses: Pasture, hayland, recreation, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, and climate
Management measures and considerations:
- The Dellwood soil is limited for crop production because of the high content of rock fragments.
- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- These soils have a low available water capacity and become droughty during periods of low rainfall.
- Using conservation tillage, winter cover crops, crop residue management, and crop rotations which include grasses and legumes helps to increase the available water capacity and improve soil fertility.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- Using frequent and light applications of irrigation water helps to avoid the leaching of plant nutrients below the rooting zone.

- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- The Dellwood soil is limited for crop production due to the high content of rock fragments.

Pasture and hayland

Suitability: Suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, and erodibility
Management measures and considerations:

- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- These soils have a low available water capacity and become droughty during periods of low rainfall.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase crop production.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability for orchards: Unsuited
Suitability for ornamental crops: Dellwood—poorly suited; Reddies—suited
Management concerns: Dellwood—flooding, droughtiness, root disease, climate, soil fertility, nutrient leaching, pesticide retention, and ball and burlap harvesting; Reddies—flooding, droughtiness, root disease, climate, soil fertility, nutrient leaching, and pesticide retention
Management measures and considerations:

- Because of the potential for flooding, these soils can be difficult to manage for orchard or ornamental crops.
- These soils have a low available water capacity and become droughty during periods of low rainfall.
- Due to the seasonal high water table and flooding, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes and drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.

- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- Using frequent and light applications of irrigation water helps to avoid the leaching of plant nutrients below the rooting zone.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents of the Reddies soil.
- Ball and burlap harvesting is severely limited in areas of the Dellwood soil due to the high content of rock fragments.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods
Suitability: Well suited
Management concerns: Flooding and pesticide retention
Management measures and considerations:
- The potential for flooding is a consideration in the placement of haul roads and log landings.
- Soil-applied herbicides are retained due to herbicide-organic matter bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of flooding and wetness. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of wetness and a poor filtering capacity. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Suited
Management concerns: Dellwood—flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, root disease, climate, and high content of rock fragments; Reddies—flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, root disease, and climate

Management measures and considerations:
- Because of the flooding, these soils are difficult to manage and have severe limitations during periods of inundation.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants. Using split applications of lime and fertilizer helps to increase their effectiveness.
- Using frequent and light applications of irrigation water helps to avoid the leaching of plant nutrients below the rooting zone.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Due to the seasonal high water table and flooding, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes and drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- The Dellwood soil is severely limited for lawns and landscaping due to the high content of rock fragments.

Interpretive Groups

Land capability classification: Dellwood—3s; Reddies—2w

DrB—Dillard loam, 1 to 5 percent slopes, rarely flooded

Setting

Landscape: Mountains valleys of intermountain hills; low and intermediate mountains; dominantly in the southern part of the county along Cane, Hominy, and Newfound Creeks and the French Broad and Swannanoa Rivers
Elevation range: 1,900 to 2,300 feet
Landform: Low stream terraces
Landform position: Concave to planar toeslopes
Shape of areas: Long and narrow
Size of areas: Up to 38 acres

Composition

Dillard soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 7 inches—dark brown loam

Subsoil:
7 to 50 inches—yellowish brown clay loam that has mottles in shades of red, brown, and gray
50 to 80 inches—light gray sandy loam

Soil Properties and Qualities

Depth class: Very deep

Drainage class: Moderately well drained
General texture class: Loamy
Permeability: Moderately slow
Available water capacity: Moderate or high
Depth to seasonal high water table: 2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Hazard of flooding: Rare, throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Soil reaction: Strongly acid to moderately acid in the A horizon, except where limed, and very strongly acid to moderately acid in the B and C horizons
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Well drained Tate soils on footslopes and Statler soils on low terraces
- Soils that have surface layers with less organic matter; in cropped fields
- Random areas of moderately eroded soils
- Well drained Braddock and Unison soils that have clayey subsoils; on high terraces
- Somewhat poorly drained French soils that have subsoils that are loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Very poorly drained Hemphill soils that have clayey subsoils; in depressions and backwater areas
- Well drained Rosman soils that have loamy subsoils; along stream channels
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and are 8 to 40 inches to strata with a high content of rock fragments; along stream channels
- Random areas of soils on greater than 5 percent slopes

Similar inclusions:
- Dillard soils that have sandy loam, fine sandy loam, and sandy clay loam surface layers

Land Use

Dominant Uses: Cropland
Other Uses: Pasture and hayland

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, climate, tilth, and soil fertility
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop

rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility and soil fertility
Management measures and considerations:
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Erodibility, wetness, climate, root disease, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and very high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.

- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Flooding, wetness, erodibility, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for dwellings.
- This map unit is difficult to manage for dwellings due to a seasonal high water table at a depth of 2.0 to 3.0 feet.
- There is a moderate or high risk of corrosion damage to uncoated steel and concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wetness, seeps and springs, and restricted permeability
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for septic tank absorption fields.
- This map unit is difficult to manage for septic tank absorption fields due to a seasonal high water table at a depth of 2.0 to 3.0 feet.
- Excavations may cut into seeps and springs. These areas should be avoided.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, seeps and springs, erodibility, and flooding
Management measures and considerations:
- When the soil is wet, unsurfaced roads are highly erodible and very slick due the content of silt and clay in the subsoil.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, wetness, flooding, root disease, soil fertility, soil compaction, and climate

Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration. Vegetating disturbed areas and using erosion-control structures, such as sediment fences, help to keep eroding soil on site.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Interpretive Groups

Land capability classification: 2w

EdC—Edneyville-Chestnut complex, 8 to 15 percent slopes, stony

Setting

Landscape: Low and intermediate mountains, dominantly in the western and eastern parts of the county
Elevation range: 2,400 to 5,000 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow or irregular
Size of areas: Up to 15 acres

Composition

Edneyville soil and similar inclusions: 50 percent
Chestnut soil and similar inclusions: 35 percent
Dissimilar inclusions: 15 percent

Typical Profile

Edneyville

Surface layer:
0 to 5 inches—dark grayish brown sandy loam

Subsoil:
5 to 23 inches—dark yellowish brown sandy loam
23 to 53 inches—yellowish brown sandy loam

Underlying material:
53 to 68 inches—light yellowish brown sandy loam saprolite

Bedrock:
68 to 80 inches—weathered biotite gneiss

Chestnut

Surface layer:
0 to 4 inches—dark brown sandy loam

Subsoil:
4 to 10 inches—dark yellowish brown loam
10 to 30 inches—yellowish brown sandy loam

Bedrock:
30 to 80 inches—weathered biotite gneiss

Soil Properties and Qualities

Depth class: Edneyville—very deep; Chestnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Edneyville—moderate; Chestnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and cobbles that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Edneyville—more than 60 inches to soft bedrock; Chestnut—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Cowee and browner soils that have more clay in the subsoil and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and nose slopes
- Random areas of Evard and browner soils that have more clay in the subsoil and have soft bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have soft bedrock at a depth of 40 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter, have more clay in the subsoil, and have bedrock at a depth of more than 60 inches; in saddles and gaps
- Widely scattered areas of rock outcrop; on narrow ridges
- Cleveland and Ashe soils that have hard bedrock at a depth of 10 to 40 inches; adjacent to rock outcrops
- Random soils that are similar to Clifton soils but have more clay and have soft bedrock at a depth of less than 60 inches
- Random areas of soils on less than 8 percent or greater than 15 percent slopes
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Edneyville and Chestnut soils that have coarse sandy loam, sandy loam, and loam surface layers
- Random areas of Buladean soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, hayland, ornamental crops, and building site development

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Edneyville—equipment use, erodibility, soil fertility, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, rooting depth, depth to bedrock, and droughtiness
Management measures and considerations:
- Using resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations which include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Incorporating plant residue into the soil helps to improve the water-holding capacity, and using shallow-rooted crops helps to overcome the moderately deep rooting depth of the Chestnut soil.

Pasture and hayland

Suitability: Well suited
Management concerns: Edneyville—equipment use, erodibility, soil fertility, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Chestnut soil is difficult to manage for the production of pasture and hay crops.
- Using drought-tolerant plants helps to increase productivity.

Orchard and ornamental crops

Suitability: Edneyville—suited; Chestnut—poorly suited
Management concerns: Edneyville—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Chestnut—equipment use,

erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness

Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of low-growing ornamentals on the uphill side.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Chestnut soil is difficult to manage for orchard and ornamental crops.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine

Suitability: Well suited

Management concerns: Edneyville—equipment use, erodibility, and seedling survival; Chestnut—equipment use, erodibility, seedling survival, and windthrow hazard

Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Chestnut soil because of the limited rooting depth.
- Using improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.

Urban Development

Dwellings

Suitability: Suited

Management concerns: Edneyville—slope, erodibility, and corrosivity; Chestnut—slope, erodibility, corrosivity, and depth to bedrock

Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying the Chestnut soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Edneyville—slope; Chestnut—slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Locating and using areas of the deeper Edneyville soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Edneyville and Chestnut—slope, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- The soft bedrock underlying the Chestnut soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Suited
Management concerns: Edneyville—slope, erodibility, droughtiness, soil fertility, and depth to bedrock; Chestnut—slope, erodibility, droughtiness, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways,

concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Chestnut soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- Using plant materials adapted to droughty conditions helps to increase productivity.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 3e

EdD—Edneyville-Chestnut complex, 15 to 30 percent slopes, stony

Setting

Landscape: Low and intermediate mountains, dominantly in the western and eastern parts of the county
Elevation range: 2,400 to 5,000 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: Up to 31 acres

Composition

Edneyville soil and similar inclusions: 50 percent
Chestnut soil and similar inclusions: 35 percent
Dissimilar inclusions: 15 percent

Typical Profile

Edneyville

Surface layer:
0 to 5 inches—dark grayish brown sandy loam

Subsoil:
5 to 23 inches—dark yellowish brown sandy loam
23 to 53 inches—yellowish brown sandy loam

Underlying material:
53 to 68 inches—light yellowish brown sandy loam saprolite

Bedrock:
68 to 80 inches—weathered biotite gneiss

Chestnut

Surface layer:
0 to 4 inches—dark brown sandy loam

Subsoil:
4 to 10 inches—dark yellowish brown loam
10 to 30 inches—yellowish brown sandy loam

Bedrock:
30 to 80 inches—weathered biotite gneiss

Soil Properties and Qualities

Depth class: Edneyville—very deep; Chestnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Edneyville—moderate; Chestnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: None
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and cobbles that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Edneyville—more than 60 inches to soft bedrock; Chestnut—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Cowee and browner soils that have more clay in the subsoil and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and nose slopes
- Random areas of Evard and browner soils that have more clay in the subsoil and have soft bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have soft bedrock at a depth of 40 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter in the surface layer, have more clay in the subsoil, and have bedrock at a depth of more than 60 inches; in saddles and gaps
- Widely scattered areas of rock outcrop; on narrow ridges
- Cleveland and Ashe soils that have hard bedrock at a depth of 10 to 40 inches; adjacent to rock outcrops
- Random soils that are similar to Clifton soils but have more clay and have soft bedrock at a depth of less than 60 inches
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Edneyville and Chestnut soils that have coarse sandy loam, sandy loam, and loam surface layers
- Random areas of Buladean soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, hayland, ornamental crops, and building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Edneyville—equipment use, erodibility, soil fertility, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- These soils are difficult to manage for cultivated crops because the slope limits equipment use.
- Using resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations which include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Incorporating plant residue into the soil helps to improve the water-holding capacity, and using shallow-rooted crops helps to overcome the moderately deep rooting depth of the Chestnut soil.

Pasture and hayland

Suitability: Suited
Management concerns: Edneyville—equipment use, erodibility, soil fertility, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Chestnut soil is difficult to manage for the production of pasture and hay crops.
- Using drought-tolerant plants helps to increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Edneyville—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.

- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of low-growing ornamentals on the uphill side.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Chestnut soil is difficult to manage for orchard and ornamental crops.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Edneyville—equipment use, erodibility, and seedling survival; Chestnut—equipment use, erodibility, seedling survival, and windthrow hazard
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Chestnut soil because of the limited rooting depth.
- Using improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Edneyville—slope, erodibility, and corrosivity; Chestnut—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.

- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying the Chestnut soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Edneyville—slope; Chestnut—slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Edneyville soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- The soft bedrock underlying the Chestnut soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Edneyville—slope, erodibility, droughtiness, soil fertility, and depth to bedrock; Chestnut—slope, erodibility, droughtiness, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Chestnut soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- Using plant materials adapted to droughty conditions helps to increase productivity.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 4e

EdE—Edneyville-Chestnut complex, 30 to 50 percent slopes, stony

Setting

Landscape: Low and intermediate mountains, dominantly in the western and eastern parts of the county
Elevation range: 2,400 to 5,000 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 325 acres

Composition

Edneyville soil and similar inclusions: 55 percent
Chestnut soil and similar inclusions: 25 percent
Dissimilar inclusions: 20 percent

Typical Profile

Edneyville

Surface layer:
0 to 5 inches—very dark grayish brown fine sandy loam

Subsoil:
5 to 43 inches—dark yellowish brown fine sandy loam

Underlying material:
43 to 80 inches—light yellowish brown sandy loam saprolite

Chestnut

Surface layer:
0 to 4 inches—dark brown gravelly fine sandy loam

Subsoil:
4 to 36 inches—yellowish brown gravelly fine sandy loam

Bedrock:
36 to 80 inches—weathered biotite gneiss

Soil Properties and Qualities

Depth class: Edneyville—very deep; Chestnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Edneyville—moderate; Chestnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed

Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Edneyville—more than 60 inches to soft bedrock; Chestnut—20 to 40 inches to soft bedrock
Other distinctive properties: Potential for downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Cowee and browner soils that have more clay in the subsoil and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and nose slopes
- Random areas of Evard and browner soils that have more clay in the subsoil and have soft bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have soft bedrock at a depth of 40 to more than 60 inches
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Porters and Unaka soils that have thicker surface layers with more organic matter; at the higher elevations and on north- to east-facing side slopes
- Widely scattered areas of rock outcrop; on narrow ridges
- Cleveland and Ashe soils that have hard bedrock at a depth of 10 to 40 inches; adjacent to rock outcrops
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Edneyville and Chestnut soils that have coarse sandy loam, sandy loam, and loam surface layers
- Random areas of Buladean soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, building site development, and ornamental crops

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Edneyville—equipment use, erodibility, soil fertility, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Chestnut soil is difficult to manage for the production of pasture and hay crops
- Using drought-tolerant plants helps to increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Edneyville—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Chestnut—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of low-growing ornamentals on the uphill side.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Chestnut soil is difficult to manage for orchard and ornamental crops.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Edneyville—equipment use, erodibility, and seedling survival; Chestnut—equipment use, erodibility, seedling survival, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.

- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Chestnut soil because of the limited rooting depth.
- Using improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Edneyville—slope, erodibility, and corrosivity; Chestnut—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying the Chestnut soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Edneyville—slope; Chestnut—slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Edneyville soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Edneyville and Chestnut—slope, slippage, erodibility, depth to bedrock, and frost action

Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Chestnut soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Edneyville—slope, erodibility, droughtiness, soil fertility, and depth to bedrock; Chestnut—slope, erodibility, droughtiness, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Chestnut soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- Using plant materials adapted to droughty conditions helps to increase productivity.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 6e

EdF—Edneyville-Chestnut complex, 50 to 95 percent slopes, stony

Setting

Landscape: Low and intermediate mountains, dominantly in the western and eastern parts of the county
Elevation range: 2,400 to 5,000 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 350 acres

Composition

Edneyville soil and similar inclusions: 45 percent
Chestnut soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Edneyville

Surface layer:
0 to 3 inches—very dark grayish brown fine sandy loam

Subsoil:
3 to 23 inches—dark yellowish brown sandy loam
23 to 39 inches—brownish yellow loam
39 to 51 inches—yellowish brown sandy loam

Underlying material:
51 to 72 inches—light yellowish brown gravelly sandy loam saprolite

Bedrock:
72 to 83 inches—weathered biotite gneiss

Chestnut

Surface layer:
0 to 4 inches—dark brown gravelly fine sandy loam

Subsoil:
4 to 36 inches—yellowish brown gravelly fine sandy loam

Bedrock:
36 to 80 inches—weathered biotite gneiss

Soil Properties and Qualities

Depth class: Edneyville—very deep; Chestnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Edneyville—moderate; Chestnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Edneyville—more than 60 inches to soft bedrock; Chestnut—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Cowee and browner soils that have more clay in the subsoil and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and nose slopes

- Random areas of Evard and browner soils that have more clay in the subsoil and have soft bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have soft bedrock at a depth of 40 to more than 60 inches
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Porters and Unaka soils that have thicker surface layers with more organic matter; at the higher elevations and on north- to east-facing side slopes
- Widely scattered areas of rock outcrop; on narrow ridges
- Cleveland and Ashe soils that have hard bedrock at a depth of 10 to 40 inches; adjacent to rock outcrops
- Random areas of soils on less than 50 percent or greater than 95 percent slopes
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Edneyville and Chestnut soils that have coarse sandy loam, sandy loam, and loam surface layers
- Random areas of Buladean soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the slope and erodibility. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope and erodibility. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Edneyville—equipment use and erodibility; Chestnut—equipment use, erodibility, and windthrow hazard

Figure 12.—Cable logging in an area of Edneyville-Chestnut complex, 50 to 95 percent slopes, stony. This method helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.

Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery (fig. 12).
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Chestnut soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope and erodibility. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope and the depth to bedrock of the Chestnut soil. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and the depth to bedrock of the Chestnut soil. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7e

EvD2—Evard-Cowee complex, 15 to 30 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the central and southern parts of the county
Elevation range: 2,200 to 3,200 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow on summits
Size of areas: Up to 1,150 acres

Composition

Evard soil and similar inclusions: 55 percent
Cowee soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—brown clay loam

Subsoil:
5 to 29 inches—reddish brown sandy clay loam
29 to 37 inches—yellowish red sandy loam

Underlying material:
37 to 80 inches—reddish brown sandy loam saprolite

Cowee

Surface layer:
0 to 5 inches—dark reddish yellow clay loam

Subsoil:
5 to 27 inches—light reddish brown gravelly sandy clay loam

Bedrock:
27 to 80 inches—weathered hornblende gneiss

Soil Properties and Qualities

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches; Cowee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Soils which have high base saturation in the lower subsoil; dominantly in the south-central and southeastern parts of the county
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Widely scattered areas of rock outcrop; on narrow ridges

Similar inclusions:
- Evard and Cowee soils that have loam and sandy clay loam surface layers
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland, wildlife habitat, pasture, and hayland
Other Uses: Cropland, building site development, and ornamental crops

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Evard—equipment use, erodibility, tilth, soil fertility, and rooting depth; Cowee—equipment use, erodibility, tilth, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- These soils are difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of the low available water capacity due the moderately deep rooting depth, the Cowee soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Suited
Management concerns: Evard—equipment use, erodibility, soil fertility, and rooting depth; Cowee—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Cowee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Evard—suited; Cowee—poorly suited
Management concerns: Evard—equipment use, erodibility, soil fertility, plant shape, and rooting depth; Cowee—equipment use, erodibility, soil fertility, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.

- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Cowee soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Evard—erodibility and equipment use; Cowee—erodibility, equipment use, and windthrow hazard
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Cowee soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and corrosivity; Cowee—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Evard—slope and restricted permeability; Cowee—slope and depth to bedrock

Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Evard soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and frost action; Cowee—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, soil compaction, soil fertility, and depth to bedrock; Cowee—slope, erodibility, soil compaction, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cowee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 4e

EvE2—Evard-Cowee complex, 30 to 50 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the central and southern parts of the county
Elevation range: 2,200 to 3,200 feet
Landform: Ridges and south- to west-facing hillslopes and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 375 acres

Composition

Evard soil and similar inclusions: 55 percent
Cowee soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—brown clay loam

Subsoil:
5 to 29 inches—reddish brown sandy clay loam
29 to 37 inches—yellowish red sandy loam

Underlying material:
37 to 80 inches—reddish brown sandy loam saprolite

Cowee

Surface layer:
0 to 5 inches—dark reddish yellow clay loam

Subsoil:
5 to 27 inches—light reddish brown gravelly sandy clay loam

Bedrock:
27 to 80 inches—weathered hornblende gneiss

Soil Properties and Qualities

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate

Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches; Cowee—20 to 40 inches to soft bedrock
Other distinctive properties: Potential for downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Soils which have high base saturation in the lower subsoil; dominantly in the south-central and southeastern parts of the county
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Widely scattered areas of rock outcrop

Similar inclusions:
- Evard and Cowee soils that have loam and sandy clay loam surface layers
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland, wildlife habitat, and pasture
Other Uses: Building site development and ornamental crops

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Evard—equipment use, erodibility, soil fertility, and rooting depth; Cowee—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Following lime and fertilizer recommendations from soil tests helps to increase the

availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Cowee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Evard—equipment use, erodibility, soil fertility, plant shape, and rooting depth; Cowee—equipment use, erodibility, soil fertility, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the noderately deep rooting depth, the Cowee soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Evard—equipment use and erodibility; Cowee—equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

- Productivity is limited in areas of the Cowee soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and corrosivity; Cowee—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Evard—slope and restricted permeability; Cowee—slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Evard soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and frost action; Cowee—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, soil compaction, soil fertility, and depth to bedrock; Cowee—slope, erodibility, soil compaction, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.

- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cowee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 6e

EvF2—Evard-Cowee complex, 50 to 95 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the central and southern parts of the county
Elevation range: 2,200 to 3,200 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 26 acres

Composition

Evard soil and similar inclusions: 50 percent
Cowee soil and similar inclusions: 30 percent
Dissimilar inclusions: 20 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—brown clay loam

Subsoil:
5 to 29 inches—reddish brown sandy clay loam
29 to 37 inches—yellowish red sandy loam

Underlying material:
37 to 80 inches—reddish brown sandy loam saprolite

Cowee

Surface layer:
0 to 5 inches—dark reddish yellow clay loam

Subsoil:
5 to 27 inches—light reddish brown gravelly sandy clay loam

Bedrock:
27 to 80 inches—weathered hornblende gneiss

Soil Properties and Qualities

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches to soft bedrock; Cowee—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Soils which have high base saturation in the lower subsoil; dominantly in the south-central and southeastern parts of the county
- Random areas of soils on less than 50 percent or greater than 95 percent slopes

Similar inclusions:
- Evard and Cowee soils that have loam and sandy clay loam surface layers
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation and pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the slope and erodibility. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope and erodibility. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Evard—equipment use and erodibility; Cowee—equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Cowee soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope and erodibility. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope and the depth to bedrock of the Cowee soil. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock of the Cowee soil. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and depth to bedrock of the Cowee soil. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7e

EwC—Evard-Cowee complex, 8 to 15 percent slopes, stony

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the central and southern parts of the county
Elevation range: 2,300 to 3,600 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow
Size of areas: Up to 67 acres

Composition

Evard soil and similar inclusions: 55 percent
Cowee soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Evard

Surface layer:
0 to 3 inches—dark yellowish brown loam

Subsoil:
3 to 6 inches—strong brown loam
6 to 14 inches—yellowish red clay loam
14 to 52 inches—red sandy clay loam

Underlying material:
52 to 74 inches—red fine sandy loam saprolite

74 to 89 inches—variegated sandy loam saprolite in shades of red, brown, yellow, gray, and white

Cowee

Surface layer:
0 to 3 inches—dark reddish brown sandy loam

Subsoil:
3 to 6 inches—strong brown sandy loam
6 to 24 inches—yellowish red sandy clay loam
24 to 28 inches—reddish brown gravelly sandy loam

Bedrock:
28 to 80 inches—weathered biotite gneiss

Soil Properties and Qualities

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches; Cowee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Soils which have high base saturation in the lower subsoil; dominantly in the south-central and southeastern parts of the county
- Random areas of soils on less than 8 percent or greater than 15 percent slopes
- Random areas of severely eroded soils where underlying material is exposed at the surface

Similar inclusions:
- Evard and Cowee soils that have sandy loam and fine sandy loam surface layers
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland, wildlife habitat, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Evard—equipment use, erodibility, tilth, soil fertility, and rooting depth; Cowee—equipment use, erodibility, tilth, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Cowee soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Well suited
Management concerns: Evard—equipment use, erodibility, soil fertility, and rooting depth; Cowee—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Cowee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Evard—suited; Cowee—poorly suited
Management concerns: Evard—equipment use, erodibility, soil fertility, plant shape, and rooting depth; Cowee—equipment use, erodibility, soil fertility, plant shape, rooting depth, and droughtiness

Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Cowee soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Well suited
Management concerns: Evard—erodibility and equipment use; Cowee—erodibility, equipment use, and windthrow hazard
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Cowee soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Evard—slope, erodibility, and corrosivity; Cowee—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.

- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Evard—slope and restricted permeability; Cowee—slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Evard soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Evard—slope and erodibility; Cowee—slope, erodibility, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Suited
Management concerns: Evard—slope, erodibility, soil compaction, soil fertility, and depth to bedrock; Cowee—slope, erodibility, soil compaction, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

- Because of the moderately deep rooting depth, the Cowee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 3e

EwD—Evard-Cowee complex, 15 to 30 percent slopes, stony

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the central and southern parts of the county
Elevation range: 2,300 to 3,600 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow on summits
Size of areas: Up to 207 acres

Composition

Evard soil and similar inclusions: 55 percent
Cowee soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—dark yellowish brown loam

Subsoil:
5 to 32 inches—yellowish red clay loam
32 to 45 inches—yellowish red loam

Underlying material:
45 to 80 inches—variegated sandy loam saprolite in shades of red, brown, yellow, and white

Cowee

Surface layer:
0 to 5 inches—dark reddish brown sandy loam

Subsoil:
5 to 38 inches—light reddish brown clay loam

Bedrock:
38 to 80 inches—weathered hornblende gneiss

Soil Properties and Qualities

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Evard—moderate; Cowee—low

Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches; Cowee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Soils which have high base saturation in the lower subsoil; dominantly in the south-central and southeastern parts of the county
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Random areas of severely eroded soils where underlying material is exposed at the surface

Similar inclusions:
- Evard and Cowee soils that have sandy loam and fine sandy loam surface layers
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland, wildlife habitat, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Evard—equipment use, erodibility, tilth, soil fertility, and rooting depth; Cowee—equipment use, erodibility, tilth, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- These soils are difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop

rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Cowee soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Suited
Management concerns: Evard—equipment use, erodibility, soil fertility, and rooting depth; Cowee—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Cowee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Evard—suited; Cowee—poorly suited
Management concerns: Evard—equipment use, erodibility, soil fertility, plant shape, and rooting depth; Cowee—equipment use, erodibility, soil fertility, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Cowee soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine

Suitability: Suited
Management concerns: Evard—erodibility and equipment use; Cowee—erodibility, equipment use, and windthrow hazard
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Cowee soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, corrosivity, and depth to bedrock; Cowee—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Evard—slope and restricted permeability; Cowee—slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Evard soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Evard—slope and erodibility; Cowee—slope, erodibility, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.

- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, soil compaction, soil fertility, and depth to bedrock; Cowee—slope, erodibility, soil compaction, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cowee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 4e

EwE—Evard-Cowee complex, 30 to 50 percent slopes, stony

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the central and southern parts of the county
Elevation range: 2,300 to 3,600 feet
Landform: Ridges and south- to west-facing hillslopes and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 489 acres

Composition

Evard soil and similar inclusions: 55 percent
Cowee soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—dark yellowish brown loam

Subsoil:
5 to 32 inches—yellowish red clay loam
32 to 45 inches—yellowish red loam

Underlying material:
45 to 80 inches—variegated sandy loam saprolite in shades of red, brown, yellow, and white

Cowee

Surface layer:
0 to 5 inches—dark reddish brown sandy loam

Subsoil:
5 to 38 inches—light reddish brown clay loam

Bedrock:
38 to 80 inches—weathered hornblende gneiss

Soil Properties and Qualities

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches; Cowee—20 to 40 inches to soft bedrock
Other distinctive properties: Potential for downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches

- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Soils which have high base saturation in the lower subsoil; dominantly in the south-central and southeastern parts of the county
- Widely scattered areas of rock outcrop

Similar inclusions:
- Evard and Cowee soils that have sandy loam and fine sandy loam surface layers
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland, wildlife habitat, and pasture
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Evard—equipment use, erodibility, soil fertility, and rooting depth; Cowee—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Cowee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Evard—equipment use, erodibility, soil fertility, plant shape, and rooting depth; Cowee—equipment use, erodibility, soil fertility, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Cowee soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Evard—equipment use and erodibility; Cowee—equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Cowee soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and corrosivity; Cowee—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.

• The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Evard—slope and restricted permeability; Cowee—slope and depth to bedrock
Management measures and considerations:
• The local Health Department should be contacted for guidance on sanitary facilities.
• Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
• Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
• Locating and using areas of the deeper Evard soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Evard—slope and erodibility; Cowee—slope, erodibility, and depth to bedrock
Management measures and considerations:
• Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
• Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
• Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
• The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, soil compaction, soil fertility, and depth to bedrock; Cowee—slope, erodibility, soil compaction, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
• Designing plantings on natural contours helps to increase water infiltration.
• Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
• Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
• Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
• In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
• Because of the moderately deep rooting depth, the Cowee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
• If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 6e

EwF—Evard-Cowee complex, 50 to 95 percent slopes, stony

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the central and southern parts of the county
Elevation range: 2,300 to 3,600 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 81 acres

Composition

Evard soil and similar inclusions: 50 percent
Cowee soil and similar inclusions: 30 percent
Dissimilar inclusions: 20 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—dark yellowish brown loam

Subsoil:
5 to 32 inches—yellowish red clay loam
32 to 45 inches—yellowish red loam

Underlying material:
45 to 80 inches—variegated sandy loam saprolite in shades of red, brown, yellow, and white

Cowee

Surface layer:
0 to 5 inches—dark reddish brown sandy loam

Subsoil:
5 to 38 inches—light reddish brown clay loam

Bedrock:
38 to 80 inches—weathered hornblende gneiss

Soil Properties and Qualities

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep

Soil slippage potential: Medium
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches to soft bedrock; Cowee—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Soils that have high base saturation in the lower subsoil; dominantly in the south-central and southeastern parts of the county
- Random areas of soils on less than 50 percent or greater than 95 percent slopes
- Widely scattered areas of rock outcrop

Similar inclusions:
- Evard and Cowee soils that have sandy loam and fine sandy loam surface layers
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and the depth to bedrock of the Cowee soil. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, and the depth to bedrock of the Cowee soil. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and the depth to bedrock of the Cowee soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for upland hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Evard—equipment use and erodibility; Cowee—equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Cowee soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, and the depth to bedrock of the Cowee soil. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope and the depth to bedrock of the Cowee soil. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and the depth to bedrock of the Cowee soil. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and the depth to bedrock of the Cowee soil. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7e

ExC—Evard-Cowee-Urban land complex, 8 to 15 percent slopes

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the central and southern parts of the county
Elevation range: 2,200 to 3,200 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow on summits
Size of areas: Up to 83 acres

Composition

Evard soil and similar inclusions: 40 percent
Cowee soil and similar inclusions: 30 percent
Urban land: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—brown clay loam

Subsoil:
5 to 29 inches—reddish brown sandy clay loam
29 to 37 inches—yellowish red sandy loam

Underlying material:
37 to 80 inches—reddish brown sandy loam saprolite

Cowee

Surface layer:
0 to 5 inches—dark reddish yellow clay loam

Subsoil:
5 to 27 inches—light reddish brown gravelly sandy clay loam

Bedrock:
27 to 80 inches—weathered hornblende gneiss

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Evard and Cowee Soils

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches; Cowee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of Udorthents, loamy
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of short, steep slopes
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Soils which have high base saturation in the lower subsoil; dominantly in the central and northeastern parts of the county
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Evard and Cowee soils that have loam and sandy clay loam surface layers
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Building site development
Other Uses: Cropland, pasture, and hayland

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Evard—slope, erodibility, and corrosivity; Cowee—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- The Evard and Cowee soils are slippery and slightly sticky when wet and slow to dry.
- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Evard—slope and restricted permeability; Cowee—slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Evard soil may improve the performance of filter fields.

- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Evard—slope and erodibility; Cowee—slope, erodibility, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Suited
Management concerns: Evard—slope, erodibility, soil compaction, soil fertility, and depth to bedrock; Cowee—slope, erodibility, soil compaction, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cowee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: Evard and Cowee—3e; Urban land—8

ExD—Evard-Cowee-Urban land complex, 15 to 30 percent slopes

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the central and southern parts of the county

Elevation range: 2,200 to 3,200 feet
Landform: Ridges and south- to west-facing hillslopes and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits
Size of areas: Up to 111 acres

Composition

Evard soil and similar inclusions: 40 percent
Cowee soil and similar inclusions: 30 percent
Urban land: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—brown clay loam

Subsoil:
5 to 29 inches—reddish brown sandy clay loam
29 to 37 inches—yellowish red sandy loam

Underlying material:
37 to 80 inches—reddish brown sandy loam saprolite

Cowee

Surface layer:
0 to 5 inches—dark reddish yellow clay loam

Subsoil:
5 to 27 inches—light reddish brown gravelly sandy clay loam

Bedrock:
27 to 80 inches—weathered hornblende gneiss

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Evard and Cowee Soils

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None

Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches; Cowee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of Udorthents, loamy
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of short, steep slopes
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Soils that have high base saturation in the lower subsoil; dominantly in the central and northeastern parts of the county
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Evard and Cowee soils that have loam and sandy clay loam surface layers
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Building site development
Other Uses: Cropland, pasture, and hayland

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and corrosivity; Cowee—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- The Evard and Cowee soils are slippery and slightly sticky when wet and slow to dry.
- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Evard—slope and restricted permeability; Cowee—slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Evard soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Evard—slope and erodibility; Cowee—slope, erodibility, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, soil compaction, soil fertility, and depth to bedrock; Cowee—slope, erodibility, soil compaction, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control

structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cowee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: Evard and Cowee—4e; Urban land—8

ExE—Evard-Cowee-Urban land complex, 30 to 50 percent slopes

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the central and southern parts of the county
Elevation range: 2,200 to 3,200 feet
Landform: Ridges and south- to west-facing hillslopes and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 66 acres

Composition

Evard soil and similar inclusions: 45 percent
Cowee soil and similar inclusions: 30 percent
Urban land: 15 percent
Dissimilar inclusions: 10 percent

Typical Profile

Evard

Surface layer:
0 to 5 inches—brown clay loam

Subsoil:
5 to 29 inches—reddish brown sandy clay loam
29 to 37 inches—yellowish red sandy loam

Underlying material:
37 to 80 inches—reddish brown sandy loam saprolite

Cowee

Surface layer:
0 to 5 inches—dark reddish yellow clay loam

Subsoil:
5 to 27 inches—light reddish brown gravelly sandy clay loam

Bedrock:
27 to 80 inches—weathered hornblende gneiss

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Evard and Cowee Soils

Depth class: Evard—very deep; Cowee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Evard—moderate; Cowee—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Evard—more than 60 inches; Cowee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of Udorthents, loamy
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of short, steep slopes
- Random areas of Chestnut, Buladean, and Edneyville soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches

- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Soils which have high base saturation in the lower subsoil; dominantly in the central and northeastern parts of the county
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Widely scattered areas of rock outcrop

Similar inclusions:
- Evard and Cowee soils that have loam and sandy clay loam surface layers
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Building site development
Other Uses: Cropland, pasture, and hayland

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and corrosivity; Cowee—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- The Evard and Cowee soils are slippery and slightly sticky when wet and slow to dry.
- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Evard—slope and restricted permeability; Cowee—slope and depth to bedrock

Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Evard soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, and frost action; Cowee—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Cowee soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Evard—slope, erodibility, soil compaction, soil fertility, and depth to bedrock; Cowee—slope, erodibility, soil compaction, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cowee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: Evard and Cowee—6e; Urban land—8

FaC2—Fannin-Lauada complex, 8 to 15 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Elevation range: 2,200 to 3,200 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow
Size of areas: Up to 22 acres

Composition

Fannin soil and similar inclusions: 45 percent
Lauada soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Fannin

Surface layer:
0 to 7 inches—brown clay loam

Subsoil:
7 to 30 inches—yellowish red clay loam
30 to 45 inches—yellowish red loam

Underlying material:
45 to 81 inches—variegated fine sandy loam saprolite in shades of red, yellow, and brown

Lauada

Surface layer:
0 to 5 inches—brown sandy clay loam

Subsoil:
5 to 11 inches—strong brown sandy clay loam
11 to 28 inches—reddish brown clay loam
28 to 33 inches—yellowish red loam

Underlying material:
33 to 37 inches—strong brown sandy loam saprolite

Bedrock:
37 to 81 inches—weathered mica schist

Soil Properties and Qualities

Depth class: Fannin—very deep; Lauada—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Fannin—moderate; Lauada—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low

Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock with a high mica content
Depth to bedrock: Fannin—more than 60 inches; Lauada—20 to 40 inches to soft bedrock
Other distinctive properties: Subsoil with a high mica content; soils subject to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Evard and browner soils that have less mica and thicker subsoils
- Cowee and browner soils that have less mica in the subsoil and have soft bedrock at a depth of 20 to 40 inches; on nose slopes and shoulder slopes
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of Micaville and Brownwood soils that have a browner subsoil and bedrock at a depth of 20 to 60 inches
- Random areas of soils that have more clay in the subsoil and bedrock at a depth of 20 to 60 or more inches
- Random areas of severely eroded soils where the underlying material is exposed at the surface
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Dillard soils that have thicker surface layers with more organic matter, are moderately well drained, and have bedrock at a depth of more than 60 inches; in concave areas on toeslopes
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Random areas of Urban land throughout the southern part of the county
- Random areas of Udorthents, loamy, throughout the southern part of the county
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Fannin soils that have loam and clay loam surface layers
- Similar soils that have brown subsoils

Land Use

Dominant Uses: Pasture, hayland, woodland, and wildlife habitat
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Fannin—equipment use, erodibility, tilth, soil fertility, and rooting depth; Lauada—equipment use, erodibility, tilth, soil fertility, rooting depth, and droughtiness

Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- The slope may limit the use of equipment in the steeper areas.
- Because of the low available water capacity due to the moderately deep rooting depth, the Lauada soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Suited
Management concerns: Fannin—equipment use, erodibility, soil fertility, and rooting depth; Lauada—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Special care should be taken when renovating pastures and establishing seedbeds to prevent further soil erosion.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Lauada soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Fannin—suited; Lauada—poorly suited
Management concerns: Fannin—equipment use, erodibility, soil fertility, ball and burlap harvesting, and plant shape; Lauada—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of the roots.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.

- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Lauada soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Well suited
Management concerns: Fannin—erodibility and equipment use; Lauada—erodibility, equipment use, and windthrow hazard
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of mica, and the clay content of the subsoil.
- Avoiding logging operations during wet periods helps to prevent rutting of the soil surface and possible root damage from compaction.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Lauada soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Fannin—slope, erodibility, low strength, slippage, differential settling, and corrosivity; Lauada—slope, erodibility, low strength, slippage, differential settling, corrosivity, and depth to bedrock
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying the Lauada soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Fannin—slope and restricted permeability; Lauada—slope, restricted permeability, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Fannin soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Fannin—low strength, slope, slippage, erodibility, differential settling, and frost action; Lauada—low strength, slope, slippage, erodibility, differential settling, frost action, and depth to bedrock
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Lauada soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Fannin—slope, erodibility, soil fertility, soil compaction, and depth to bedrock; Lauada—slope, erodibility, soil fertility, soil compaction, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

- Because of the moderately deep rooting depth, the Lauada soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 3e

FaD2—Fannin-Lauada complex, 15 to 30 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Elevation range: 2,200 to 3,200 feet
Landform: Ridges and south- to west-facing hillslopes and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and oblong or irregular on side slopes
Size of areas: Up to 105 acres

Composition

Fannin soil and similar inclusions: 45 percent
Lauada soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Fannin

Surface layer:
0 to 7 inches—brown clay loam

Subsoil:
7 to 30 inches—yellowish red clay loam
30 to 45 inches—yellowish red loam

Underlying material:
45 to 81 inches—variegated fine sandy loam saprolite in shades of red, yellow, and brown

Lauada

Surface layer:
0 to 5 inches—brown sandy clay loam

Subsoil:
5 to 11 inches—strong brown sandy clay loam
11 to 28 inches—reddish brown clay loam
28 to 33 inches—yellowish red loam

Underlying material:
33 to 37 inches—strong brown sandy loam saprolite

Bedrock:
37 to 81 inches—weathered mica schist

Soil Properties and Qualities

Depth class: Fannin—very deep; Lauada—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Fannin—moderate; Lauada—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock with a high mica content
Depth to bedrock: Fannin—more than 60 inches; Lauada—20 to 40 inches to soft bedrock
Other distinctive properties: Subsoil with a high mica content; soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Evard and browner soils that have less mica and thicker subsoils
- Cowee and browner soils that have less mica in the subsoil and have soft bedrock at a depth of 20 to 40 inches; on nose slopes and shoulder slopes
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of Micaville and Brownwood soils that have a browner subsoil and have bedrock at a depth of 20 to 60 inches
- Random areas of soils that have more clay in the subsoil and have bedrock at a depth of 20 to 60 or more inches
- Random areas of severely eroded soils where the underlying material is exposed at the surface
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Random areas of Urban land throughout the southern part of the county
- Random areas of Udorthents, loamy, throughout the southern part of the county
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Fannin soils that have loam and clay loam surface layers
- Similar soils that have brown subsoils

Land Use

Dominant Uses: Pasture, hayland, woodland, and wildlife habitat
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Fannin—equipment use, erodibility, tilth, soil fertility, and rooting depth; Lauada—equipment use, erodibility, tilth, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- These soils are difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Lauada soil is difficult to manage for cultivated crops

Pasture and hayland

Suitability: Suited
Management concerns: Fannin—equipment use, erodibility, soil fertility, and rooting depth; Lauada—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Special care should be taken when renovating pastures and establishing seedbeds to prevent further soil erosion.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Lauada soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Fannin—suited; Lauada—poorly suited
Management concerns: Fannin—equipment use, erodibility, soil fertility, ball and burlap harvesting, and plant shape; Lauada—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of the roots.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Lauada soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Fannin—erodibility and equipment use; Lauada—erodibility, equipment use, and windthrow hazard
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of mica, and the clay content of the subsoil.
- Avoiding logging operations during wet periods helps to prevent rutting of the soil surface and possible root damage from compaction.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Lauada soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Fannin—slope, erodibility, low strength, slippage, differential settling, and corrosivity; Lauada—slope, erodibility, low strength, slippage, differential settling, corrosivity, and depth to bedrock
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.

- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying the Lauada soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Fannin—slope and restricted permeability; Lauada—slope, restricted permeability, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Fannin soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Fannin—low strength, slope, slippage, erodibility, differential settling, and frost action; Lauada—low strength, slope, slippage, erodibility, differential settling, frost action, and depth to bedrock
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Lauada soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Fannin—slope, erodibility, soil fertility, soil compaction, and depth to bedrock; Lauada—slope, erodibility, soil fertility, soil compaction, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Lauada soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 4e

FaE2—Fannin-Lauada complex, 30 to 50 percent slopes, moderately eroded

Setting

Landscape: Intermountain hills and low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Elevation range: 2,200 to 3,200 feet
Landform: South- to west-facing hillslopes and mountain slopes
Landform position: Side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 115 acres

Composition

Fannin soil and similar inclusions: 45 percent
Lauada soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Fannin

Surface layer:
0 to 7 inches—brown clay loam

Subsoil:
7 to 30 inches—yellowish red clay loam
30 to 45 inches—yellowish red loam

Underlying material:
45 to 81 inches—variegated fine sandy loam saprolite in shades of red, yellow, and brown

Lauada

Surface layer:
0 to 5 inches—brown sandy clay loam

Subsoil:
5 to 11 inches—strong brown sandy clay loam
11 to 28 inches—reddish brown clay loam
28 to 33 inches—yellowish red loam

Underlying material:
33 to 37 inches—strong brown sandy loam saprolite

Bedrock:
37 to 81 inches—weathered mica schist

Soil Properties and Qualities

Depth class: Fannin—very deep; Lauada—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Fannin—moderate; Lauada—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Medium
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock with a high mica content
Depth to bedrock: Fannin—more than 60 inches; Lauada—20 to 40 inches to soft bedrock
Other distinctive properties: Subsoil with a high mica content; soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Evard and browner soils that have less mica and thicker subsoils
- Cowee and browner soils that have less mica in the subsoil and have soft bedrock at a depth of 20 to 40 inches; on nose slopes and shoulder slopes
- Random areas of Micaville and Brownwood soils that have a browner subsoil and have bedrock at a depth of 20 to 60 inches
- Random areas of soils that have more clay in the subsoil and have bedrock at a depth of 20 to 60 or more inches
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of severely eroded soils where the underlying material is exposed at the surface
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Random areas of Urban land throughout the southern part of the county

- Random areas of Udorthents, loamy, throughout the southern part of the county
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Fannin soils that have loam and clay loam surface layers
- Similar soils that have brown subsoils

Land Use

Dominant Uses: Pasture, woodland, and wildlife habitat
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Fannin—equipment use, erodibility, soil fertility, and rooting depth; Lauada—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Special care should be taken when renovating pastures and establishing seedbeds to prevent further soil erosion.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Lauada soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Fannin—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Lauada—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.

- The slope affects the shape of ornamentals on the uphill side.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of the roots.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Lauada soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Fannin and Lauada—erodibility and equipment use; Lauada—erodibility, equipment use, and windthrow hazard
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of mica, and the clay content of the subsoil.
- Avoiding logging operations during wet periods helps to prevent rutting of the soil surface and possible root damage from compaction.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Lauada soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Fannin—slope, erodibility, low strength, slippage, differential settling, and corrosivity; Lauada—slope, erodibility, low strength, slippage, differential settling, corrosivity, and depth to bedrock
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying the Lauada soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Fannin—slope and restricted permeability; Lauada—slope, restricted permeability, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Fannin soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Fannin—low strength, slope, slippage, erodibility, differential settling, and frost action; Lauada—low strength, slope, slippage, erodibility, differential settling, frost action, and depth to bedrock
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Lauada soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Fannin—slope, erodibility, soil fertility, soil compaction, and depth to bedrock; Lauada—slope, erodibility, soil fertility, soil compaction, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.

- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Lauada soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 6e

FnB—Fannin-Lauada-Urban land complex, 2 to 8 percent slopes

Setting

Landscape: Intermountain hills and low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Elevation range: 2,200 to 3,000 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow
Size of areas: Up to 18 acres

Composition

Fannin soil and similar inclusions: 40 percent
Lauada soil and similar inclusions: 30 percent
Urban land: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Fannin

Surface layer:
0 to 7 inches—brown clay loam

Subsoil:
7 to 30 inches—yellowish red clay loam
30 to 45 inches—yellowish red loam

Underlying material:
45 to 81 inches—variegated fine sandy loam saprolite in shades of red, yellow, and brown

Lauada

Surface layer:
0 to 5 inches—brown sandy clay loam

Subsoil:
5 to 11 inches—strong brown sandy clay loam
11 to 28 inches—reddish brown clay loam
28 to 33 inches—yellowish red loam

Underlying material:
33 to 37 inches—strong brown sandy loam saprolite

Bedrock:
37 to 81 inches—weathered mica schist

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Fannin and Lauada Soils

Depth class: Fannin—very deep; Lauada—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Fannin—moderate; Lauada—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock with a high mica content
Depth to bedrock: Fannin—more than 60 inches; Lauada—20 to 40 inches to soft bedrock
Other distinctive properties: Subsoil with a high mica content; soils subject to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Udorthents, loamy
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of short, steep slopes
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of soils that have less mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Dillard soils that have thicker surface layers with more organic matter and are moderately well drained

- Soils which have high base saturation in the lower subsoil; dominantly in the central and northeastern parts of the county
- Random areas of soils on greater than 8 percent slopes

Similar inclusions:
- Fannin and Lauada soils that have loam and clay loam surface layers
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Building site development
Other Uses: Cropland, pasture, and hayland

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Fannin—erodibility, low strength, slippage, differential settling, and corrosivity; Lauada—erodibility, low strength, slippage, differential settling, corrosivity, and depth to bedrock
Management measures and considerations:
- The Fannin and Lauada soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- These soils are slippery and slightly sticky when wet and slow to dry.
- The soft bedrock underlying the Lauada soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Fannin—restricted permeability; Lauada—restricted permeability and depth to bedrock

Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Fannin soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Suited
Management concerns: Fannin—low strength, slippage, erodibility, differential settling, and frost action; Lauada—low strength, slippage, erodibility, differential settling, frost action, and depth to bedrock
Management measures and considerations:
- The Fannin and Lauada soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Lauada soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Suited
Management concerns: Fannin—erodibility, soil fertility, soil compaction, and depth to bedrock; Lauada—erodibility, soil fertility, soil compaction, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Lauada soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: Fannin and Lauada—2e; Urban land—8

FnC—Fannin-Lauada-Urban land complex, 8 to 15 percent slopes

Setting

Landscape: Intermountain hills and low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Elevation range: 2,200 to 3,000 feet
Landform: Ridges, hillslopes, and mountain slopes
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow to wide on summits and irregular on side slopes
Size of areas: Up to 25 acres

Composition

Fannin soil and similar inclusions: 40 percent
Lauada soil and similar inclusions: 30 percent
Urban land: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Fannin

Surface layer:
0 to 7 inches—brown clay loam

Subsoil:
7 to 30 inches—yellowish red clay loam
30 to 45 inches—yellowish red loam

Underlying material:
45 to 81 inches—variegated fine sandy loam saprolite in shades of red, yellow, and brown

Lauada

Surface layer:
0 to 5 inches—brown sandy clay loam

Subsoil:
5 to 11 inches—strong brown sandy clay loam
11 to 28 inches—reddish brown clay loam
28 to 33 inches—yellowish red loam

Underlying material:
33 to 37 inches—strong brown sandy loam saprolite

Bedrock:
37 to 81 inches—weathered mica schist

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process

of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Fannin and Lauada Soils

Depth class: Fannin—very deep; Lauada—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Fannin—moderate; Lauada—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock with a high mica content
Depth to bedrock: Fannin—more than 60 inches; Lauada—20 to 40 inches to soft bedrock
Other distinctive properties: Subsoil with a high mica content; soils subject to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Udorthents, loamy
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of short, steep slopes
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of soils that have less mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Dillard soils that have thicker surface layers with more organic matter and are moderately well drained
- Soils which have high base saturation in the lower subsoil; dominantly in the central and northeastern parts of the county
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Fannin and Lauada soils that have loam and clay loam surface layers
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Building site development
Other Uses: Cropland, pasture, and hayland

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Fannin—slope, erodibility, low strength, slippage, differential settling, and corrosivity; Lauada—slope, erodibility, low strength, slippage, differential settling, corrosivity, and depth to bedrock
Management measures and considerations:
- The Fannin and Lauada soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- These soils are slippery and slightly sticky when wet and slow to dry.
- The soft bedrock underlying the Lauada soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Fannin—slope and restricted permeability; Lauada—slope, restricted permeability, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.

- Locating and using areas of the deeper Fannin soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Fannin—low strength, slope, slippage, erodibility, differential settling, and frost action; Lauada—low strength, slope, slippage, erodibility, differential settling, frost action, and depth to bedrock
Management measures and considerations:
- The Fannin and Lauada soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Lauada soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Suited
Management concerns: Fannin—slope, erodibility, soil fertility, soil compaction, and depth to bedrock; Lauada—slope, erodibility, soil fertility, soil compaction, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Lauada soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: Fannin and Lauada—3e; Urban land—8

FnD—Fannin-Lauada-Urban land complex, 15 to 30 percent slopes

Setting

Landscape: Intermountain hills and low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Elevation range: 2,200 to 3,000 feet
Landform: Ridges, hillslopes, and mountain slopes
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow to wide on summits and irregular on side slopes
Size of areas: Up to 81 acres

Composition

Fannin soil and similar inclusions: 40 percent
Lauada soil and similar inclusions: 30 percent
Urban land: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Fannin

Surface layer:
0 to 7 inches—brown clay loam

Subsoil:
7 to 30 inches—yellowish red clay loam
30 to 45 inches—yellowish red loam

Underlying material:
45 to 81 inches—variegated fine sandy loam saprolite in shades of red, yellow, and brown

Lauada

Surface layer:
0 to 5 inches—brown sandy clay loam

Subsoil:
5 to 11 inches—strong brown sandy clay loam
11 to 28 inches—reddish brown clay loam
28 to 33 inches—yellowish red loam

Underlying material:
33 to 37 inches—strong brown sandy loam saprolite

Bedrock:
37 to 81 inches—weathered mica schist

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of

the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Fannin and Lauada Soils

Depth class: Fannin—very deep; Lauada—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Fannin—moderate; Lauada—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock with a high mica content
Depth to bedrock: Fannin—more than 60 inches; Lauada—20 to 40 inches to soft bedrock
Other distinctive properties: Subsoil with a high mica content; soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Udorthents, loamy
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of short, steep slopes
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Random areas of soils that have less mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Soils which have high base saturation in the lower subsoil; dominantly in the central and northeastern parts of the county
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Fannin and Lauada soils that have loam and clay loam surface layers
- Random areas of similar soils that have brown subsoils
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Building site development
Other Uses: Cropland, pasture, and hayland

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Fannin—slope, erodibility, low strength, slippage, differential settling, and corrosivity; Lauada—slope, erodibility, low strength, slippage, differential settling, corrosivity, and depth to bedrock
Management measures and considerations:
- The Fannin and Lauada soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.
- These soils are slippery and slightly sticky when wet and slow to dry.
- The soft bedrock underlying the Lauada soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Fannin—slope and restricted permeability; Lauada—slope, restricted permeability, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Locating and using areas of the deeper Fannin soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Fannin—low strength, slope, slippage, erodibility, differential

settling, and frost action; Lauada—low strength, slope, slippage, erodibility, differential settling, frost action, and depth to bedrock

Management measures and considerations:

- The Fannin and Lauada soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying the Lauada soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited

Management concerns: Fannin—slope, erodibility, soil fertility, soil compaction, and depth to bedrock; Lauada—slope, erodibility, soil fertility, soil compaction, depth to bedrock, and droughtiness

Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Lauada soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: Fannin and Lauada—4e; Urban land—8

FrA—French loam, 0 to 3 percent slopes, occasionally flooded

Setting

Landscape: Mountains valleys of intermountain hills; low and intermediate mountains throughout the county

Elevation range: 1,900 to 3,100 feet
Landform: Flood plains
Landform position: Planar to slightly concave bottomland slopes
Shape of areas: Long and narrow
Size of areas: Up to 351 acres

Composition

French soil and similar inclusions: 90 percent
Dissimilar inclusions: 10 percent

Typical Profile

Surface layer:
0 to 12 inches—brown loam

Subsoil:
12 to 30 inches—dark yellowish brown loam

Underlying material:
30 to 80 inches—grayish brown extremely gravelly sand

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Somewhat poorly drained
General texture class: Loamy in the upper part and sandy-skeletal in the lower part
Permeability: Moderate in the surface layer and subsoil and rapid in the underlying material
Available water capacity: Low
Depth to seasonal high water table: 1.0 to 2.5 feet from December through May and 2.0 to 3.5 feet from June through November
Hazard of flooding: Occasional, throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Strongly acid to slightly acid throughout the profile
Parent material: Alluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Depth to contrasting material: 20 to 40 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Other distinctive properties: Soil subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and 8 to 40 inches to strata with a high content of rock fragments; along stream channels

- Nikwasi soils that are poorly drained; in depressions, old stream channels, and backwater areas
- Moderately well drained Dillard soils that have more clay in the subsoil; on low stream terraces and toeslopes
- Well drained Tate soils on toeslopes and Statler soils on low terraces
- Well drained Rosman soils that have strata with a high content of rock fragments at a depth of more than 40 inches; in the slightly higher-lying positions
- Random areas of soils on greater than 3 percent slopes
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways

Similar inclusions:
- French soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland, ornamental crops, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Flooding, wetness, soil fertility, nutrient leaching, pesticide retention, and climate
Management measures and considerations:
- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- Maintaining existing artificial drainage systems helps to reduce wetness limitations caused by a seasonal high water table and improves soil productivity.
- Using conservation tillage, winter cover crops, crop residue management, and crop rotations which include grasses and legumes, helps to increase the available water capacity and improve soil fertility.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Flooding, wetness, pesticide retention, soil fertility, nutrient leaching, and erodibility
Management measures and considerations:
- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- Maintaining existing drainageways and ditches helps to remove excess water from a seasonal high water table.

- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Unsuited to orchards; poorly suited to ornamental crops
Management concerns: Flooding, wetness, root disease, climate, soil fertility, nutrient leaching, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- Because of the potential for flooding, this soil can be difficult to manage for ornamental crops.
- Maintaining existing artificial drainage systems helps to reduce wetness limitations caused by a seasonal high water table and improves soil productivity.
- Due to the seasonal high water table, soil wetness, and flooding, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods
Suitability: Suited
Management concerns: Wetness, flooding, and pesticide retention
Management measures and considerations:
- Restricting logging operations to periods when the soil is not saturated helps to prevent rutting and soil compaction.

- The potential for flooding is a consideration in the placement of haul roads and log landings.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the flooding and wetness. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the wetness, poor filtering capacity, and flooding. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the flooding and wetness. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Suited
Management concerns: Flooding, wetness, root disease, pesticide retention, soil fertility, nutrient leaching, and climate
Management measures and considerations:
- Because of the flooding, this soil is difficult to manage.
- Maintaining existing artificial drainage systems helps to reduce wetness limitations caused by a seasonal high water table and improves soil productivity.
- Due to the seasonal high water table, soil wetness, and flooding, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Interpretive Groups

Land capability classification: 3w

HcE—Heintooga-Chiltoskie complex, 30 to 50 percent slopes, very stony

Setting

Landscape: High mountains in the Sandymush Bald area in the northwestern part of the county
Elevation range: 4,200 to 4,700 feet
Landform: Coves and drainageways
Landform position: Footslopes and head slopes
Shape of areas: Irregular or long and narrow
Size of areas: Up to 10 acres

Composition

Heintooga soil and similar inclusions: 55 percent
Chiltoskie soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Heintooga

Surface layer:
0 to 12 inches—dark brown very flaggy loam

Subsoil:
12 to 25 inches—brown extremely channery fine sandy loam
25 to 80 inches—yellowish brown extremely flaggy coarse sandy loam

Chiltoskie

Surface layer:
0 to 8 inches—very dark brown loam

Subsoil:
8 to 43 inches—dark yellowish brown loam
43 to 80 inches—dark yellow brown very channery sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Heintooga—loamy with many rock fragments; Chiltoskie—loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Heintooga—medium; Chiltoskie—low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Heintooga—low; Chiltoskie—moderate

Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high rainfall, and a short growing season
Soil reaction: Ultra acid to strongly acid throughout the profile
Parent material: Colluvium derived from low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; high content of rock fragments in the Heintooga soil; soil slippage potential when soils are saturated

Minor Components

Dissimilar inclusions:
- Areas of rubble land; in drainageways and below rock outcrops
- Random soils that are similar to the Chiltoskie soil but have more clay in the subsoil
- Cataloochee, Guyot, and Oconaluftee soils that have soft bedrock at a depth of 20 to more than 60 inches; along the outer edge of map unit delineations
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Unprotected areas that are windswept

Similar inclusions:
- Heintooga and Chiltoskie soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, very stony surface, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the very stony surface and short growing season. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, very stony surface, and short growing season. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the very stony

surface, short growing season, and low productivity. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Heintooga—unsuited; Chiltoskie—poorly sutied
Management concerns: Heintooga—slope, large stones, erodibility, seeps and springs, climate, corrosivity, and cutbanks cave; Chiltoskie—slope, large stones, erodibility, seeps and springs, climate, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Large stones and boulders will be encountered during excavation.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Design modifications are needed to overcome prolonged freezing temperatures.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Heintooga—unsuited; Chiltoskie—poorly suited
Management concerns: Heintooga—large stones, slope, seeps and springs, climate, and poor filtering capacity; Chiltoskie—large stones, slope, seeps and springs, and climate
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Large stones and boulders will be encountered during excavation.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Design modifications are needed to overcome prolonged freezing temperatures.
- Measures that improve the filtering capacity should be considered; the Heintooga soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, large stones, seeps and springs, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Large stones and boulders will be encountered during excavation.

- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The Heintooga soil is subject to uneven settling and may be unstable if not properly compacted.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, large stones, climate, pesticide retention, and soil fertility
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, the very stony surface, and the high content of rock fragments in the Heintooga soil.
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: 7s

HpA—Hemphill loam, 0 to 3 percent slopes, rarely flooded

Setting

Landscape: Mountain valleys of intermountain hills and low and intermediate mountains, dominantly in the southern part of the county along Cane, Hominy, and Newfound Creeks and the French Broad and Swannanoa Rivers
Elevation range: 1,900 to 2,300 feet
Landform: Low stream terraces
Landform position: Planar to slightly concave bottomland slopes
Shape of areas: Irregular
Size of areas: Up to 24 acres

Composition

Hemphill soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 12 inches—very dark grayish brown loam

Subsoil:
12 to 48 inches—gray clay

Underlying material:
48 to 57 inches—gray clay loam that has mottles in shades of brown and red
57 to 80 inches—light brownish gray fine sandy loam that has mottles in shades of brown and gray

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Very poorly drained
General texture class: Clayey
Permeability: Moderately slow in the surface layer, slow in the subsoil, and moderate in the underlying material
Available water capacity: High
Depth to seasonal high water table: 1.0 foot or less from December through May and 0.5 foot to 1.5 feet from June through November
Hazard of flooding: Rare, throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: High
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Moderately well drained Dillard soils that have less clay in the subsoil; on low stream terraces and toeslopes
- Well drained Tate soils on footslopes and Statler soils on low terraces
- Well drained Rosman soils that have a loamy subsoil; along stream channels
- Somewhat poorly drained French soils that have less clay in the subsoil; along stream channels
- Poorly drained Nikwasi soils that have strata with a high content of rock fragments at a depth of 20 to more than 40 inches; in depressions and backwater areas
- Random areas of soils on greater than 3 percent slopes

Similar inclusions:
- Hemphill soils that have loam and sandy clay loam surface layers

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the wetness and flooding. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Flooding, wetness, pesticide retention, soil fertility, nutrient leaching, and erodibility
Management measures and considerations:
- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- Maintaining existing drainageways and ditches helps to remove excess water.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer and the clay content of the subsoil. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the wetness and flooding. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the wetness and flooding. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the flooding and wetness. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the flooding and wetness. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the wetness and flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the wetness and flooding. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 4w

IoA—Iotla loam, 0 to 2 percent slopes, occasionally flooded

Setting

Landscape: Mountain valleys of intermountain hills and low and intermediate mountains, dominantly along Cane, Hominy, Reems, and Newfound Creeks and the French Broad and Swannanoa Rivers
Elevation range: 1,800 to 2,300 feet
Landform: Flood plains
Landform position: Planar to slightly concave bottomland slopes
Shape of areas: Long and narrow
Size of areas: Up to 103 acres

Composition

Iotla soil and similar inclusions: 90 percent
Dissimilar inclusions: 10 percent

Typical Profile

Surface layer:
0 to 8 inches—brown loam

Subsoil:
8 to 31 inches—dark yellowish brown sandy loam
31 to 47 inches—dark grayish brown sandy loam

Underlying material:
47 to 53 inches—grayish brown loamy sand
53 to 81 inches—grayish brown very gravelly sand

Soil Properties and Qualities

Depth class: Very deep

Drainage class: Somewhat poorly drained
General texture class: Loamy from 40 to more than 60 inches over deposits of gravel and cobbles that are stratified with sandy and loamy material
Permeability: Moderate
Available water capacity: Low
Depth to seasonal high water table: 1.5 to 2.0 feet from December through May and 2.0 to 2.5 feet from June through November
Hazard of flooding: Occasional, throughout the year with standing water for less than 2 days
Shrink-swell potential: Low or none
Slope class: Nearly level or gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Strongly acid to neutral in the upper 30 inches; strongly acid to slightly acid below a depth of 30 inches
Parent material: Alluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Depth to contrasting material: 40 to more than 60 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Other distinctive properties: Soil subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:
- Biltmore soils that are well drained and sandy and have strata with a high content of rock fragments at a depth of more than 40 inches; in the slightly higher-lying positions
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and have strata with a high content of rock fragments at a depth of 8 to 40 inches; along stream channels
- Toxaway soils that are very poorly drained; in depressions, old stream channels, and backwater areas
- Nikwasi soils that are poorly drained; in depressions, old stream channels, and backwater areas
- Moderately well drained Dillard soils that have more clay in the subsoil; on low stream terraces and toeslopes
- Well drained Tate soils on toeslopes and Statler soils on low terraces
- Well drained Rosman soils that have strata with a high content of rock fragments at a depth of more than 40 inches; in the slightly higher-lying positions
- Random areas of soils on greater than 2 percent slopes
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways

Similar inclusions:
- Iotla soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Ornamental crops, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Flooding, wetness, soil fertility, nutrient leaching, pesticide retention, and climate
Management measures and considerations:
- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- Maintaining existing artificial drainage systems helps to reduce the wetness limitations caused by a seasonal high water table and improves soil productivity.
- Using conservation tillage, winter cover crops, crop residue management, and crop rotations which include grasses and legumes helps to increase the available water capacity and improve soil fertility.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Flooding, wetness, pesticide retention, soil fertility, nutrient leaching, and erodibility
Management measures and considerations:
- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- Maintaining existing drainageways and ditches helps to remove excess water from a seasonal high water table.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Unsuited to orchards; poorly suited to ornamental crops
Management concerns: Flooding, wetness, root disease, climate, soil fertility, nutrient leaching, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- Because of the potential for flooding, this soil can be difficult to manage for ornamental crops.
- Maintaining existing artificial drainage systems helps to reduce the wetness limitations caused by a seasonal high water table and improves soil productivity.
- Due to the seasonal high water table, soil wetness, and flooding, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods
Suitability: Suited
Management concerns: Wetness, flooding, and pesticide retention
Management measures and considerations:
- Restricting logging operations to periods when the soil is not saturated helps to prevent rutting and soil compaction.
- The potential for flooding is a consideration in the placement of haul roads and log landings.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the flooding and wetness. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the

wetness, poor filtering capacity, and flooding. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the flooding and wetness. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Suited
Management concerns: Flooding, wetness, root disease, pesticide retention, soil fertility, nutrient leaching, and climate
Management measures and considerations:
- Because of the flooding, this soil is difficult to manage.
- Maintaining existing artificial drainage systems helps to reduce the wetness limitations caused by a seasonal high water table and improves soil productivity.
- Due to the seasonal high water table, soil wetness, and flooding, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Interpretive Groups

Land capability classification: 3w

JbB—Junaluska-Brasstown complex, 2 to 8 percent slopes

Setting

Landscape: Low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Elevation range: 2,100 to 3,200 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow
Size of areas: Up to 24 acres

Composition

Junaluska soil and similar inclusions: 50 percent

Brasstown soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Junaluska

Surface layer:
0 to 3 inches—dark yellowish brown fine sandy loam

Subsoil:
3 to 9 inches—strong brown loam
9 to 21 inches—red fine sandy clay loam
21 to 26 inches—yellowish red loam

Underlying material:
26 to 31 inches—yellowish red channery loam

Bedrock:
31 to 81 inches—weathered metasandstone

Brasstown

Surface layer:
0 to 4 inches—dark yellowish brown loam

Subsoil:
4 to 10 inches—strong brown silt loam
10 to 31 inches—yellowish red clay loam
31 to 38 inches—yellowish red loam

Underlying material:
38 to 51 inches—variegated channery loam saprolite in shades of red, brown, and yellow

Bedrock:
51 to 80 inches—weathered phyllite

Soil Properties and Qualities

Depth class: Junaluska—moderately deep; Brasstown—deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Junaluska—low; Brasstown—moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Junaluska—20 to 40 inches; Brasstown—40 to 60 inches to soft bedrock

Minor Components

Dissimilar inclusions:

- Random areas of Soco and Stecoah soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to 60 inches
- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles, in gaps, and in concave areas at the heads of drains
- Random areas of Cowee and Evard soils that have less silt in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of soils that have a clayey subsoil and have bedrock at a depth of 40 to more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on greater than 8 percent slopes

Similar inclusions:

- Junaluska and Brasstown soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development and woodland

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Junaluska—equipment use, erodibility, tilth, soil fertility, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, tilth, soil fertility, and rooting depth
Management measures and considerations:

- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of the the low available water capacity due to the moderately deep rooting depth, the Junaluska soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Well suited
Management concerns: Junaluska—equipment use, erodibility, soil fertility, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:

- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.

- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Junaluska soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Well suited to orchards; poorly suited to ornamental crops
Management concerns: Junaluska—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Junaluska soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Low or moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Junaluska—equipment use, erodibility, rooting depth, and windthrow hazard; Brasstown—equipment use, erodibility, and rooting depth
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.

- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the silt and clay content in the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Using improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.
- Productivity is limited in areas of the Junaluska soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Well suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- These soils are slippery and sticky when wet and slow to dry.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Brasstown soil may improve the performance of filter fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Well suited
Management concerns: Slope, low strength, erodibility, depth to bedrock, and frost action

Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Suited
Management concerns: Junaluska—slope, erodibility, soil fertility, depth to bedrock, and droughtiness; Brasstown—slope, erodibility, soil fertility, and depth to bedrock
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- These soils are slippery and sticky when wet and slow to dry.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Junaluska soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 2e

JbC—Junaluska-Brasstown complex, 8 to 15 percent slopes

Setting

Landscape: Low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Elevation range: 2,100 to 3,200 feet
Landform: Ridges
Landform position: Summits

Shape of areas: Long and narrow
Size of areas: Up to 134 acres

Composition

Junaluska soil and similar inclusions: 50 percent
Brasstown soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Junaluska

Surface layer:
0 to 3 inches—dark yellowish brown fine sandy loam

Subsoil:
3 to 9 inches—strong brown loam
9 to 21 inches—red fine sandy clay loam
21 to 26 inches—yellowish red loam

Underlying material:
26 to 31 inches—yellowish red channery loam

Bedrock:
31 to 81 inches—weathered metasandstone

Brasstown

Surface layer:
0 to 4 inches—dark yellowish brown loam

Subsoil:
4 to 10 inches—strong brown silt loam
10 to 31 inches—yellowish red clay loam
31 to 38 inches—yellowish red loam

Underlying material:
38 to 51 inches—variegated channery loam saprolite in shades of red, brown, and yellow

Bedrock:
51 to 80 inches—weathered phyllite

Soil Properties and Qualities

Depth class: Junaluska—moderately deep; Brasstown—deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Junaluska—low; Brasstown—moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low to high

Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Junaluska—20 to 40 inches; Brasstown—40 to 60 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of Soco and Stecoah soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to 60 inches
- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles, in gaps, and in concave areas at the heads of drains
- Random areas of Cowee and Evard soils that have less silt in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in saddles, in gaps, and in concave areas at the head of drains
- Random areas of soils that have a clayey subsoil and have bedrock at a depth of 40 to more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Junaluska and Brasstown soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development and woodland

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Junaluska—equipment use, erodibility, tilth, soil fertility, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, tilth, soil fertility, and rooting depth
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Junaluska soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Well suited
Management concerns: Junaluska—equipment use, erodibility, soil fertility, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Junaluska soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Junaluska—poorly suited; Brasstown—suited
Management concerns: Junaluska—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Junaluska soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Low or moderate for upland hardwoods and high for eastern white pine

Suitability: Suited
Management concerns: Junaluska—equipment use, erodibility, rooting depth, and windthrow hazard; Brasstown—equipment use, erodibility, and rooting depth
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the silt and clay content in the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Using improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.
- Productivity is limited in areas of the Junaluska soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Junaluska and Brasstown—slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- These soils are slippery and sticky when wet and slow to dry.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

- Locating and using areas of the deeper Brasstown soil may improve the performance of filter fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Suited
Management concerns: Slope, low strength, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Suited
Management concerns: Junaluska—slope, erodibility, soil fertility, depth to bedrock, and droughtiness; Brasstown—slope, erodibility, soil fertility, and depth to bedrock
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- These soils are slippery and sticky when wet and slow to dry.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Junaluska soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 3e

JbD—Junaluska-Brasstown complex, 15 to 30 percent slopes

Setting

Landscape: Low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Elevation range: 2,100 to 3,200 feet
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits or irregular on side slopes
Size of areas: Up to 326 acres

Composition

Junaluska soil and similar inclusions: 50 percent
Brasstown soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Junaluska

Surface layer:
0 to 3 inches—dark yellowish brown fine sandy loam

Subsoil:
3 to 9 inches—strong brown loam
9 to 21 inches—red fine sandy clay loam
21 to 26 inches—yellowish red loam

Underlying material:
26 to 31 inches—yellowish red channery loam

Bedrock:
31 to 81 inches—weathered metasandstone

Brasstown

Surface layer:
0 to 4 inches—dark yellowish brown loam

Subsoil:
4 to 10 inches—strong brown silt loam
10 to 31 inches—yellowish red clay loam
31 to 38 inches—yellowish red loam

Underlying material:
38 to 51 inches—variegated channery loam saprolite in shades of red, brown, and yellow

Bedrock:
51 to 80 inches—weathered phyllite

Soil Properties and Qualities

Depth class: Junaluska—moderately deep; Brasstown—deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Junaluska—low; Brasstown—moderate

Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Junaluska—20 to 40 inches; Brasstown—40 to 60 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of Soco and Stecoah soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to 60 inches
- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles, in gaps, and in concave areas at the heads of drains
- Cataska and Sylco soils that have less clay and more rock fragments in the subsoil and have bedrock at a depth of 10 to 40 inches; on shoulder slopes and adjacent to widely scattered areas of rock outcrop
- Tate soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in saddles, in gaps, and in concave areas at the head of drains
- Random areas of Cowee and Evard soils that have less silt in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Widely scattered areas of rock outcrop; on narrow ridges
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Junaluska and Brasstown soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Pasture, hayland, and cropland
Other Uses: Woodland, building site development, wildlife habitat, and recreation

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Junaluska—equipment use, erodibility, tilth, soil fertility, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, tilth, soil fertility, and rooting depth
Management measures and considerations:
- These soils are difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop

rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Junaluska soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Suited
Management concerns: Junaluska—equipment use, erodibility, soil fertility, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Junaluska soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Junaluska—poorly suited; Brasstown—suited
Management concerns: Junaluska—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the

moderately deep rooting depth, the Junaluska soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Low or moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Junaluska—equipment use, erodibility, rooting depth, and windthrow hazard; Brasstown—equipment use, erodibility, and rooting depth
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the silt and clay content in the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Junaluska soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

- Locating and using areas of the deeper Brasstown soil may improve the performance of filter fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, low strength, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Junaluska—slope, erodibility, soil fertility, depth to bedrock, and droughtiness; Brasstown—slope, erodibility, soil fertility, and depth to bedrock
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Junaluska soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 4e

JbE—Junaluska-Brasstown complex, 30 to 50 percent slopes

Setting

Landscape: Low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Elevation range: 2,100 to 3,200 feet
Landform: Mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 81 acres

Composition

Junaluska soil and similar inclusions: 50 percent
Brasstown soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Junaluska

Surface layer:
0 to 3 inches—dark yellowish brown fine sandy loam

Subsoil:
3 to 9 inches—strong brown loam
9 to 21 inches—red fine sandy clay loam
21 to 26 inches—yellowish red loam

Underlying material:
26 to 31 inches—yellowish red channery loam

Bedrock:
31 to 81 inches—weathered metasandstone

Brasstown

Surface layer:
0 to 4 inches—dark yellowish brown loam

Subsoil:
4 to 10 inches—strong brown silt loam
10 to 31 inches—yellowish red clay loam
31 to 38 inches—yellowish red loam

Underlying material:
38 to 51 inches—variegated channery loam saprolite in shades of red, brown, and yellow

Bedrock:
51 to 80 inches—weathered phyllite

Soil Properties and Qualities

Depth class: Junaluska—moderately deep; Brasstown—deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Junaluska—low; Brasstown—moderate

Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Junaluska—20 to 40 inches; Brasstown—40 to 60 inches to soft bedrock
Other distinctive properties: Potential for downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of Soco and Stecoah soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to 60 inches
- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles, in gaps, and in concave areas at the heads of drains
- Northcove soils that have more rock fragments in the subsoil and have bedrock at a depth of more than 60 inches; in drainageways, on toeslopes, on benches, and below rock outcrops
- Cataska and Sylco soils that have less clay and more rock fragments in the subsoil and have bedrock at a depth of 10 to 40 inches; on shoulder slopes and adjacent to widely scattered areas of rock outcrop
- Cheoah and Jeffrey soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Random areas of Cowee and Evard soils that have less silt in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Widely scattered areas of rock outcrop; on narrow ridges
- Random areas of soils on less than 30 percent or greater than 50 percent slopes

Similar inclusions:
- Junaluska and Brasstown soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, hayland, cropland, building site development, and recreation

Agricultural Development

Cropland

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Junaluska—equipment use, erodibility, soil fertility, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Junaluska soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Junaluska—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness; Brasstown—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Junaluska soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Low or moderate for upland hardwoods and high for eastern white pine
Suitability: Suited

Management concerns: Junaluska—equipment use, erodibility, rooting depth, and windthrow hazard; Brasstown—equipment use, erodibility, and rooting depth
Management measures and considerations:
• Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
• Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
• Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
• Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
• Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
• When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the silt and clay content in the subsoil.
• Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
• Livestock should not graze in areas managed for woodland.
• Productivity is limited in areas of the Junaluska soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
• Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
• Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
• Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
• Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
• The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
• The local Health Department should be contacted for guidance on sanitary facilities.
• Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
• Locating and using areas of the deeper Brasstown soil may improve the performance of filter fields.
• Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited

Management concerns: Slope, low strength, erodibility, depth to bedrock, and frost action

Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited

Management concerns: Junaluska—slope, erodibility, soil fertility, depth to bedrock, and droughtiness; Brasstown—slope, erodibility, soil fertility, and depth to bedrock

Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Junaluska soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 6e

KsB—Kanuga-Swannanoa complex, 2 to 8 percent slopes

Setting

Landscape: Mountain valleys of low mountains and intermountain hills, dominantly in the south-central and southeastern parts of the county

Elevation range: 1,900 to 2,400 feet

Landform: High stream terraces

Landform position: Benches

Shape of areas: Long and narrow or irregular
Size of areas: Up to 16 acres

Composition

Kanuga soil and similar inclusions: 45 percent
Swannanoa soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Kanuga

Surface layer:
0 to 12 inches—dark grayish brown loam

Subsoil:
12 to 38 inches—yellowish brown clay
38 to 58 inches—light gray clay
58 to 68 inches—light brownish gray gravelly sandy clay loam

Underlying material:
68 to 91 inches—gray very gravelly sandy clay loam

Swannanoa

Surface layer:
0 to 15 inches—very dark grayish brown silty clay loam

Subsoil:
15 to 31 inches—dark grayish brown clay
31 to 44 inches—grayish brown clay loam
44 to 64 inches—gray clay

Underlying material:
64 to 91 inches—gray gravelly sandy clay

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Kanuga—moderately well drained; Swannanoa—somewhat poorly drained
General texture class: Clayey
Permeability: Moderately slow
Available water capacity: High
Depth to seasonal high water table: Kanuga—2.0 to 3.0 feet from December through May and 2.5 to 3.5 feet from June through November; Swannanoa—1.5 to 2.0 feet from December through May and 2.0 to 2.5 feet from June through November
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soils subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid throughout the profile

Parent material: Old alluvium and colluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content; random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Well drained Unison or Braddock soils in the slightly higher-lying positions
- Soils that are moderately eroded; in cropped fields
- Soils that have surface layers with less organic matter; in cropped fields
- Poorly drained Hemphill soils; in depressions, old stream channels, and backwater areas
- Random areas of moderately well drained Dillard soils that have less clay in the subsoil
- Random areas of poorly drained soils that have less clay in the subsoil
- Random areas of well drained Statler soils that have less clay in the subsoil
- Random areas of soils on less than 2 percent or greater than 8 percent slopes

Similar inclusions:
- Kanuga soils that have fine sandy loam, silt loam, and sandy clay loam surface layers
- Swannanoa soils that have fine sandy loam, silt loam, and sandy clay loam surface layers

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- These soils may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, root penetration, pesticide retention, and soil fertility
Management measures and considerations:
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- These soils may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Erodibility, wetness, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.
- These soils may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and very high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Erodibility, wetness, high clay content, shrink-swell potential, corrosivity, seeps and springs, and large stones
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for dwellings.
- This map unit is difficult to manage for dwellings due to a seasonal high water table at a depth of 2.0 to 3.0 feet.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- These soils are slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Large stones may be encountered during excavation.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wetness, seeps and springs, restricted permeability, high clay content, and large stones

Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for septic tank absorption fields.
- This map unit is difficult to manage for septic tank absorption fields due to a seasonal high water table at a depth of 2.0 to 3.0 feet.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones may be encountered during excavation.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, high clay content, erodibility, frost action, and seeps and springs
Management measures and considerations:
- When the soil is wet, unsurfaced roads are highly erodible and very slick due the content of silt and clay in the subsoil.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- These soils are slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- These soils are slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- In areas where water concentrates, such as drainageways, Fraser fir and other

ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- These soils may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: Kanuga—2w; Swannanoa—3w

KsC—Kanuga-Swannanoa complex, 8 to 15 percent slopes

Setting

Landscape: Mountain valleys of low mountains and intermountain hills, dominantly in the south-central and southeastern parts of the county
Elevation range: 1,900 to 2,400 feet
Landform: High stream terraces
Landform position: Benches
Shape of areas: Long and narrow or irregular
Size of areas: Up to 26 acres

Composition

Kanuga soil and similar inclusions: 45 percent
Swannanoa soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Kanuga

Surface layer:
0 to 12 inches—dark grayish brown loam

Subsoil:
12 to 38 inches—yellowish brown clay
38 to 58 inches—light gray clay
58 to 68 inches—light brownish gray gravelly sandy clay loam

Underlying material:
68 to 91 inches—gray very gravelly sandy clay loam

Swannanoa

Surface layer:
0 to 15 inches—very dark grayish brown silty clay loam

Subsoil:
15 to 31 inches—dark grayish brown clay
31 to 44 inches—grayish brown clay loam
44 to 64 inches—gray clay

Underlying material:
64 to 91 inches—gray gravelly sandy clay

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Kanuga—moderately well drained; Swannanoa—somewhat poorly drained
General texture class: Clayey
Permeability: Moderately slow
Available water capacity: High
Depth to seasonal high water table: Kanuga—2.0 to 3.0 feet from December through May and 2.5 to 3.5 feet from June through November; Swannanoa—1.5 to 2.0 feet from December through May and 2.0 to 2.5 feet from June through November
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soils subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Old alluvium and colluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content; random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Well drained Unison or Braddock soils in the slightly higher-lying positions
- Soils that are moderately eroded; in cropped fields
- Soils that have surface layers with less organic matter; in cropped fields
- Poorly drained Hemphill soils; in depressions, old stream channels, and backwater areas
- Random areas of moderately well drained Dillard soils that have less clay in the subsoil
- Random areas of poorly drained soils that have less clay in the subsoil
- Random areas of well drained Statler soils that have less clay in the subsoil
- Well drained Tate soils that have less clay in the subsoil; on footslopes
- Random areas of soils on less than 2 percent or greater than 8 percent slopes

Similar inclusions:
- Kanuga soils that have fine sandy loam, silt loam, and sandy clay loam surface layers
- Swannanoa soils that have fine sandy loam, silt loam, and sandy clay loam surface layers

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- These soils may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, root penetration, pesticide retention, and soil fertility
Management measures and considerations:
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- These soils may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Erodibility, wetness, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.
- These soils may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and very high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Erodibility, wetness, high clay content, shrink-swell potential, corrosivity, seeps and springs, and large stones
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for dwellings.
- This map unit is difficult to manage for dwellings due to a seasonal high water table at a depth of 2.0 to 3.0 feet.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- These soils are slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Large stones may be encountered during excavation.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wetness, seeps and springs, restricted permeability, high clay content, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for septic tank absorption fields.
- This map unit is difficult to manage for septic tank absorption fields due to a seasonal high water table at a depth of 2.0 to 3.0 feet.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones may be encountered during excavation.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, high clay content, erodibility, frost action, and seeps and springs
Management measures and considerations:
- When the soil is wet, unsurfaced roads are highly erodible and very slick due the content of silt and clay in the subsoil.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.

- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- These soils are slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- These soils are slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- These soils may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: Kanuga—3e; Swannanoa—3w

MvD—Mars Hill-Walnut complex, 15 to 30 percent slopes, stony

Setting

Landscape: Low and intermediate mountains, dominantly in the north-central and northeastern parts of the county
Elevation range: 2,100 to 3,600 feet

Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow
Size of areas: Up to 73 acres

Composition

Mars Hill soil and similar inclusions: 55 percent
Walnut soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Mars Hill

Surface layer:
0 to 3 inches—dark yellowish brown loam
3 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 35 inches—dark yellowish brown fine sandy loam

Underlying material:
35 to 46 inches—dark yellowish brown fine sandy loam saprolite

Bedrock:
46 to 80 inches—weathered, migmatitic gneiss bedrock

Walnut

Surface layer:
0 to 2 inches—brown fine sandy loam
2 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 21 inches—strong brown loam
21 to 27 inches—strong brown gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered, migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Mars Hill—deep; Walnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Mars Hill—moderate; Walnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral throughout the profile

Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Mars Hill—40 to 60 inches; Walnut—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of Oteen soils that have soft bedrock at a depth of at 10 to 20 inches
- Cowee and Evard soils that have more clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes and nose slopes
- Random areas of soils that have more mica in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter, have more clay in the subsoil, and have bedrock at a depth of more than 60 inches; in saddles and gaps
- Random soils that are similar to the Clifton soil but have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Widely scattered areas of rock outcrop; on narrow ridges

Similar inclusions:
- Mars Hill and Walnut soils that have sandy loam and loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, hayland, cropland, and building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Mars Hill—equipment use, erodibility, soil fertility, and rooting depth; Walnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management concerns:
- These soils are difficult to manage for cultivated crops because the slope limits equipment use.
- Using resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations which include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Incorporating plant residue into the soil helps to improve the water-holding capacity, and using shallow-rooted crops helps to overcome the moderately deep rooting depth of the Walnut soil.

Pasture and hayland

Suitability: Suited
Management concerns: Mars Hill—equipment use, erodibility, soil fertility, and rooting depth; Walnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness

Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Walnut soil is difficult to manage for the production of pasture and hay crops.
- Using drought-tolerant plants helps to increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Mars Hill—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Walnut—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Walnut soil is difficult to manage for orchard and ornamental crops.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase productivity.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Mars Hill—equipment use and erodibility; Walnut—equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.

- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Walnut soil because of the limited rooting depth.
- Using improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Mars Hill soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Mars Hill—slope, erodibility, droughtiness, soil fertility, and depth to bedrock; Walnut—slope, erodibility, droughtiness, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Walnut soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.
- Using plant materials adapted to droughty conditions helps to increase productivity.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: 4e

MvE—Mars Hill-Walnut complex, 30 to 50 percent slopes, stony

Setting

Landscape: Low and intermediate mountains, dominantly in the north-central and northeastern parts of the county
Elevation range: 2,100 to 3,600 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 176 acres

Composition

Mars Hill soil and similar inclusions: 50 percent
Walnut soil and similar inclusions: 35 percent
Dissimilar inclusions: 15 percent

Typical Profile

Mars Hill

Surface layer:
0 to 3 inches—dark yellowish brown loam
3 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 35 inches—dark yellowish brown fine sandy loam

Underlying material:
35 to 46 inches—dark yellowish brown fine sandy loam saprolite

Bedrock:
46 to 80 inches—weathered, migmatitic gneiss bedrock

Walnut

Surface layer:
0 to 2 inches—brown fine sandy loam
2 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 21 inches—strong brown loam
21 to 27 inches—strong brown gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered, migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Mars Hill—deep; Walnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Mars Hill—moderate; Walnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Mars Hill—40 to 60 inches; Walnut—20 to 40 inches to soft bedrock
Other distinctive properties: Potential for downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of Oteen soils that have soft bedrock at a depth of at 10 to 20 inches

- Cowee and Evard soils that have more clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes and nose slopes
- Random areas of soils that have more mica in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Soils that have thicker surface layers with more organic matter; at the higher elevations and on north- to east-facing side slopes
- Random soils that are similar to Clifton soils but have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Widely scattered areas of rock outcrop; on narrow ridges

Similar inclusions:
- Mars Hill and Walnut soils that have sandy loam and loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, hayland, cropland, and building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Mars Hill—equipment use, erodibility, soil fertility, and rooting depth; Walnut—equipment use, erodibility, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Walnut soil is difficult to manage for the production of pasture and hay crops.
- Using drought-tolerant plants helps to increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Mars Hill—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Walnut—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Walnut soil is difficult to manage for orchard and ornamental crops.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase productivity.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Mars Hill—equipment use and erodibility; Walnut—equipment use, erodibility, and windthrow hazard (fig. 13)
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Walnut soil because of the limited rooting depth.
- Using improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of

Figure 13.—A windthrown tree in an area of Mars Hill-Walnut complex, 30 to 50 percent slopes, stony. Windthrow is a management concern for the Walnut soil in this map unit because of the depth to bedrock.

reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock

Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Mars Hill soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Mars Hill—slope, erodibility, droughtiness, soil fertility, and depth to bedrock; Walnut—slope, erodibility, droughtiness, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Walnut soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.
- Using plant materials adapted to droughty conditions helps to increase productivity.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: 6e

MvF—Mars Hill-Walnut complex, 50 to 95 percent slopes, stony

Setting

Landscape: Low and intermediate mountains, dominantly in the southeastern and south-central parts of the county
Elevation range: 2,100 to 3,600 feet
Landform: Mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 26 acres

Composition

Mars Hill soil and similar inclusions: 50 percent
Walnut soil and similar inclusions: 35 percent
Dissimilar inclusions: 15 percent

Typical Profile

Mars Hill

Surface layer:
0 to 3 inches—dark yellowish brown loam
3 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 35 inches—dark yellowish brown fine sandy loam

Underlying material:
35 to 46 inches—dark yellowish brown fine sandy loam saprolite

Bedrock:
46 to 80 inches—weathered, migmatitic gneiss bedrock

Walnut

Surface layer:
0 to 2 inches—brown fine sandy loam
2 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 21 inches—strong brown loam
21 to 27 inches—strong brown gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered, migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Mars Hill—deep; Walnut—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Mars Hill—moderate; Walnut—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium

Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Mars Hill—40 to 60 inches to soft bedrock; Walnut—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of Oteen soils that have soft bedrock at a depth of at 10 to 20 inches
- Random areas of soils that have more mica in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Random areas of soils on less than 50 percent or greater than 95 percent slopes
- Cowee and Evard soils that have more clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes and nose slopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Random areas of soils on less than 50 percent or greater than 95 percent slopes
- Widely scattered areas of rock outcrop

Similar inclusions:
- Mars Hill and Walnut soils that have sandy loam and loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops

because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Mars Hill—equipment use and erodibility; Walnut—equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Walnut soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope and depth to bedrock. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7e

MwD—Micaville-Brownwood complex, 15 to 30 percent slopes, stony

Setting

Landscape: Low hills and low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Elevation range: 2,400 to 3,600 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow
Size of areas: Up to 42 acres

Composition

Micaville soil and similar inclusions: 50 percent
Brownwood soil and similar inclusions: 35 percent
Dissimilar inclusions: 15 percent

Typical Profile

Micaville

Surface layer:
0 to 4 inches—dark yellowish brown sandy loam

Subsoil:
4 to 7 inches—dark yellowish brown sandy loam
7 to 39 inches—yellowish brown sandy loam
39 to 52 inches—yellowish brown gravelly sandy loam

Bedrock:
52 to 81 inches—weathered mica schist

Brownwood

Surface layer:
0 to 5 inches—dark yellowish brown fine sandy loam

Subsoil:
5 to 22 inches—dark yellowish brown loam
22 to 27 inches—yellowish brown sandy loam

Bedrock:
27 to 81 inches—weathered mica schist

Soil Properties and Qualities

Depth class: Micaville—deep; Brownwood—moderately deep
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: None
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Rock fragments on the surface: Widely scattered surface stones and cobbles that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum weathered from high-grade metamorphic rocks having a high mica content, such as mica schist and mica gneiss
Depth to bedrock: Micaville—40 to 60 inches; Brownwood—20 to 40 inches to soft bedrock
Other distinctive properties: Subsoil with a high mica content; soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Chestnut, Buladean, and Edneyville soils that have less mica in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of redder Fannin and Lauada soils that have more clay in the subsoil and bedrock at a depth of 20 to more than 60 inches
- Random areas of redder Evard and Cowee soils that have less mica and more clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Tate soils that have thicker surface layers with more organic matter in the surface layer, have more clay in the subsoil, and have bedrock at a depth of more than 60 inches; in saddles and gaps
- Random areas of severely eroded soils where the underlying material is exposed at the surface
- Cleveland and Ashe soils that have less mica and have hard bedrock at a depth of 10 to 40 inches; adjacent to rock outcrops
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Widely scattered areas of rock outcrop; on narrow ridges
- Random areas of Urban land throughout the southern part of the county
- Random areas of Udorthents, loamy, throughout the southern part of the county

Similar inclusions:
- Micaville and Brownwood soils that have coarse sandy loam and loam surface layers
- Random areas of soils that have soft bedrock at a depth of 60 or more inches
- Similar soils that have red subsoils

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, hayland, ornamental crops, and building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Micaville—equipment use, erodibility, tilth, soil fertility, and rooting depth; Brownwood—equipment use, erodibility, tilth, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- These soils are difficult to manage for cultivated crops because the slope limits equipment use.
- Using resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations which include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize soil erosion and increases rainfall infiltration.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Incorporating plant residue into the soil helps to improve the water-holding capacity, and using shallow-rooted crops helps to overcome the moderately deep rooting depth of the Brownwood soil.
- Because of the low available water capacity due to the moderately deep rooting depth, the Brownwood soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Suited
Management concerns: Micaville—equipment use, erodibility, tilth, soil fertility, and rooting depth; Brownwood—equipment use, erodibility, tilth, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Special care should be taken when renovating pastures and establishing seedbeds to prevent further soil erosion.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Brownwood soil is difficult to manage for the production of pasture and hay crops.
- Using drought-tolerant plants helps to increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Micaville—equipment use, erodibility, tilth, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Brownwood—equipment use, erodibility, tilth, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of low-growing ornamentals on the uphill side.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Brownwood soil is difficult to manage for orchard and ornamental crops.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase productivity.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Micaville—equipment use, erodibility, and droughtiness; Brownwood—equipment use, erodibility, droughtiness, and windthrow hazard
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of mica, and the clay content of the subsoil.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Chestnut soil because of the limited rooting depth.
- Using improved varieties of eastern white pine helps to increase productivity.

- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Micaville—slope, erodibility, low strength, slippage, differential settling, and corrosivity; Brownwood—slope, erodibility, low strength, slippage, differential settling, corrosivity, and depth to bedrock
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying the Brownwood soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Micaville—slope, erodibility, low strength, slippage, differential settling, and corrosivity; Brownwood—slope, erodibility, low strength, slippage, differential settling, corrosivity, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Micaville soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Micaville—slope, erodibility, low strength, slippage, differential settling, and corrosivity; Brownwood—slope, erodibility, low strength, slippage, differential settling, corrosivity, and depth to bedrock
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- The soft bedrock underlying the Brownwood soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Micaville—slope, erodibility, soil fertility, soil compaction, and depth to bedrock; Brownwood—slope, erodibility, soil fertility, soil compaction, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Brownwood soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- Using plant materials adapted to droughty conditions helps to increase productivity.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 4e

MwE—Micaville-Brownwood complex, 30 to 50 percent slopes, stony

Setting

Landscape: Low hills and low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Elevation range: 2,400 to 3,600 feet
Landform: South- to west-facing hillslopes and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 64 acres

Composition

Micaville soil and similar inclusions: 45 percent

Brownwood soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Micaville

Surface layer:
0 to 4 inches—dark yellowish brown sandy loam

Subsoil:
4 to 7 inches—dark yellowish brown sandy loam
7 to 39 inches—yellowish brown sandy loam
39 to 52 inches—yellowish brown gravelly sandy loam

Bedrock:
52 to 81 inches—weathered mica schist

Brownwood

Surface layer:
0 to 5 inches—dark yellowish brown fine sandy loam

Subsoil:
5 to 22 inches—dark yellowish brown loam
22 to 27 inches—yellowish brown sandy loam

Bedrock:
27 to 81 inches—weathered mica schist

Soil Properties and Qualities

Depth class: Micaville—deep; Brownwood—moderately deep
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: None
Slope class: Steep
Soil slippage potential: Medium
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Rock fragments on the surface: Widely scattered surface stones and cobbles that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from high-grade metamorphic rocks with a high mica content, such as mica schist and mica gneiss
Depth to bedrock: Micaville—40 to 60 inches; Brownwood—20 to 40 inches to soft bedrock
Other distinctive properties: Subsoil with a high mica content; soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Chestnut, Buladean, and Edneyville soils that have less mica in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of redder Fannin and Lauada soils that have more clay in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Random areas of redder Evard and Cowee soils that have less mica and more clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Random areas of severely eroded soils where the underlying material is exposed at the surface
- Cleveland and Ashe soils that have less mica and have hard bedrock at a depth of 10 to 40 inches; adjacent to rock outcrops
- Soils that have thicker surface layers with more organic matter on north- to east-facing side slopes
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Widely scattered areas of rock outcrop; on narrow ridges
- Random areas of Urban land throughout the southern part of the county
- Random areas of Udorthents, loamy, throughout the southern part of the county

Similar inclusions:
- Micaville and Brownwood soils that have coarse sandy loam and loam surface layers
- Random areas of soils that have soft bedrock at a depth of 60 or more inches
- Similar soils that have red subsoils

Land Use

Dominant Uses: Pasture, woodland, and wildlife habitat
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Micaville—equipment use, erodibility, tilth, soil fertility, and rooting depth; Brownwood—equipment use, erodibility, tilth, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Special care should be taken when renovating pastures and establishing seedbeds to prevent further soil erosion.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.

- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Brownwood soil is difficult to manage for the production of pasture and hay crops.
- Using drought-tolerant plants helps to increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Micaville—equipment use, erodibility, tilth, soil fertility, ball and burlap harvesting, plant shape, and rooting depth; Brownwood—equipment use, erodibility, tilth, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness
Management measures and considerations:

- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of low-growing ornamentals on the uphill side.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Brownwood soil is difficult to manage for orchard and ornamental crops.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase productivity.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Micaville—equipment use, erodibility, and droughtiness; Brownwood—equipment use, erodibility, droughtiness, and windthrow hazard
Management measures and considerations:

- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.

- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of mica, and the clay content of the subsoil.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Brownwood soil because of the limited rooting depth.
- Using improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Micaville—slope, erodibility, low strength, slippage, differential settling, and corrosivity; Brownwood—slope, erodibility, low strength, slippage, differential settling, corrosivity, and depth to bedrock
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Using corrosion-resistant materials for foundations and basements helps to reduce the risk of damage to concrete.
- The soft bedrock underlying the Brownwood soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Micaville—slope, erodibility, low strength, slippage, differential settling, and corrosivity; Brownwood—slope, erodibility, low strength, slippage, differential settling, corrosivity, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

- Locating and using areas of the deeper Micaville soil may improve the performance of filter fields.
- Increasing the size of the septic tank absorption field helps to improve its performance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Micaville—slope, erodibility, low strength, slippage, differential settling, and corrosivity; Brownwood—slope, erodibility, low strength, slippage, differential settling, corrosivity, and depth to bedrock
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- The soft bedrock underlying the Brownwood soil should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Micaville—slope, erodibility, soil fertility, soil compaction, and depth to bedrock; Brownwood—slope, erodibility, soil fertility, soil compaction, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Brownwood soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- Using plant materials adapted to droughty conditions helps to increase productivity.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 6e

MwF—Micaville-Brownwood complex, 50 to 95 percent slopes, stony

Setting

Landscape: Low hills and low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Elevation range: 2,400 to 3,600 feet
Landform: South- to west-facing hillslopes and mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 26 acres

Composition

Micaville soil and similar inclusions: 45 percent
Brownwood soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Micaville

Surface layer:
0 to 4 inches—dark yellowish brown sandy loam

Subsoil:
4 to 7 inches—dark yellowish brown sandy loam
7 to 39 inches—yellowish brown sandy loam
39 to 52 inches—yellowish brown gravelly sandy loam

Bedrock:
52 to 81 inches—weathered mica schist

Brownwood

Surface layer:
0 to 5 inches—dark yellowish brown fine sandy loam

Subsoil:
5 to 22 inches—dark yellowish brown loam
22 to 27 inches—yellowish brown sandy loam

Bedrock:
27 to 81 inches—weathered mica schist

Soil Properties and Qualities

Depth class: Micaville—deep; Brownwood—moderately deep
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: None
Slope class: Very steep
Soil slippage potential: High
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed

Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Rock fragments on the surface: Widely scattered surface stones and cobbles that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from high-grade metamorphic rocks with a high mica content, such as mica schist and mica gneiss
Depth to bedrock: Micaville—40 to 60 inches; Brownwood—20 to 40 inches to soft bedrock
Other distinctive properties: Subsoil with a high mica content; soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material

Minor Components

Dissimilar inclusions:
- Random areas of Chestnut, Buladean, and Edneyville soils that have less mica in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of redder Fannin and Lauada soils that have more clay in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Random areas of redder Evard and Cowee soils that have less mica and more clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Random areas of severely eroded soils where the underlying material is exposed at the surface
- Cleveland and Ashe soils that have less mica and have hard bedrock at a depth of 10 to 40 inches; adjacent to rock outcrops
- Soils that have thicker surface layers with more organic matter on north- to east-facing side slopes
- Random areas of soils on less than 50 percent or greater than 95 percent slopes
- Widely scattered areas of rock outcrop; on narrow ridges
- Random areas of Urban land throughout the southern part of the county
- Random areas of Udorthents, loamy, throughout the southern part of the county

Similar inclusions:
- Micaville and Brownwood soils that have coarse sandy loam and loam surface layers
- Random areas of soils that have soft bedrock at a depth of 60 or more inches
- Similar soils that have red subsoils

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture

Agricultural Development

Cropland

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the slope and erodibility. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope and erodibility. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Micaville—equipment use, erodibility, and droughtiness; Brownwood—equipment use, erodibility, droughtiness, and windthrow hazard
Management measures and considerations:
- These soils are highly erodible, droughty, difficult to compact, and unstable, especially when used as fill, due to the high mica content of the subsoil and underlying material.
- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes is difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of mica, and the clay content of the subsoil.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Brownwood soil because of the limited rooting depth.
- Using improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.

Urban Development

Dwellings

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for dwellings because of the slope and erodibility. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope and the depth to bedrock of the Brownwood soil. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, and depth to bedrock of the Brownwood soil. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7e

NkA—Nikwasi loam, 0 to 2 percent slopes, frequently flooded

Setting

Landscape: Mountain valleys of low and intermediate mountains, scattered throughout the county
Elevation range: 2,000 to 2,700 feet
Landform: Flood plains
Landform position: Planar to slightly concave bottomland slopes
Shape of areas: Irregular
Size of areas: Up to 21 acres

Composition

Nikwasi soil and similar inclusions: 75 percent
Dissimilar inclusions: 25 percent

Typical Profile

Surface layer:
0 to 14 inches—black loam
14 to 34 inches—very dark gray sandy loam

Underlying material:
34 to 47 inches—dark grayish brown very gravelly loamy sand
47 to 80 inches—dark gray very cobbly coarse sand

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Very poorly drained
General texture class: Loamy in the upper part and sandy or sandy-skeletal in the lower part
Permeability: Moderately rapid in the surface horizon and rapid in the underlying material
Available water capacity: Low
Depth to seasonal high water table: 1.0 foot or less from December through May and 0.5 foot to 1.5 feet from June through November
Hazard of flooding: Frequent, throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Depth to contrasting material: 24 to 40 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Other distinctive properties: Soil subject to ponding for brief duration throughout the year; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Somewhat poorly drained French and poorly drained Nikwasi soils that have a subsoil that is loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; in depressions, old stream channels, and backwater areas
- Soils that have strata with a high content of rock fragments at a depth of more than 40 inches; in the slightly higher-lying positions
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and are 8 to 40 inches to strata with a high content of rock fragments; along stream channels
- Soils that have a rare flood hazard; adjacent to toeslopes
- Poorly drained soils that have a clayey subsoil; in low-lying depressions in backwater areas
- Random areas of soils on greater than 2 percent slopes

Similar inclusions:
- Nikwasi soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the wetness and flooding. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Flooding, wetness, pesticide retention, soil fertility, nutrient leaching, and erodibility
Management measures and considerations:
- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- Maintaining existing drainageways and ditches helps to remove excess water.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the wetness and flooding. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the wetness and flooding. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the flooding and wetness. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the flooding, wetness, and poor filtering capacity. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the wetness and flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the wetness and flooding. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 4w

NtD—Northcove-Maymead complex, 15 to 30 percent slopes, very stony

Setting

Landscape: Low and intermediate mountains, dominantly in the southeastern part of the county
Elevation range: 2,700 to 3,200 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Shape of areas: Long and narrow or irregular
Size of areas: Up to 57 acres

Composition

Northcove soil and similar inclusions: 55 percent
Maymead soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Northcove

Surface layer:
0 to 3 inches—dark grayish brown very cobbly loam

Subsoil:
3 to 60 inches—brownish yellow very cobbly sandy loam

Underlying material:
60 to 80 inches—light yellowish brown very cobbly sandy loam

Maymead

Surface layer:
0 to 5 inches—very dark grayish brown loam

Subsoil:
5 to 80 inches—brown cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Northcove—loamy with many rock fragments; Maymead—loamy
Permeability: Moderately rapid
Available water capacity: Maymead—moderate; Northcove—low or moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Moderate or high
Potential frost action: Northcove—low; Maymead—moderate
Special climatic conditions: Soils subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Northcove—extremely acid to moderately acid throughout the profile; Maymead—very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; high content of rock fragments in the Northcove soil

Minor Components

Dissimilar inclusions:
- Random areas of soils that have more clay in the subsoil
- Soils that are poorly drained; in areas of seeps and springs
- Areas of Northcove soils where the surface fragments have been removed
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and on toeslopes
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways and on the outer edge of map unit delineations
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Maymead soils that have fine sandy loam and loam surface layers
- Northcove soils that have fine sandy loam and loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, building site development, and recreation

Agricultural Development

Cropland

Suitability: Northcove—unsuited; Maymead—poorly suited
Management concerns: Equipment use, erodibility, soil fertility, pesticide retention, and climate
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, very stony surface, and the high content of rock fragments in the Northcove soil.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- The slope and surface stones limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Northcove—unsuited; Maymead—suited
Management concerns: Equipment use, ball and burlap harvesting, erodibility, climate, pesticide retention, and soil fertility
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, very stony surface, and the high content of rock fragments in the Northcove soil.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: High for cove hardwoods

Suitability: Suited
Management concerns: Equipment use, erodibility, and pesticide retention
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Northcove—poorly suited; Maymead—suited
Management concerns: Northcove—slope, large stones, erodibility, seeps and springs, corrosivity, and cutbanks cave; Maymead—slope, large stones, erodibility, seeps and springs, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing structures to conform with natural slopes helps to improve soil performance.
- Large stones and boulders will be encountered during excavation.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Northcove—unsuited; Maymead—suited
Management concerns: Northcove—slope, large stones, seeps and springs, and poor filtering capacity; Maymead—slope, large stones, and seeps and springs
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Large stones and boulders will be encountered during excavation.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Northcove soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Poorly suited
Management concerns: Northcove—slope, erodibility, large stones, seeps and springs,

and differential settling; Maymead—slope, erodibility, large stones, seeps and springs, and frost action

Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Large stones and boulders will be encountered during excavation.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- The Northcove soil is subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited

Management concerns: Slope, erodibility, large stones, climate, pesticide retention, and soil fertility

Management measures and considerations:

- This map unit is limited for lawns and landscaping because of the slope, very stony surface, and the high content of rock fragments in the Northcove soil.
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: Northcove—7s; Maymead—4s

NtE—Northcove-Maymead complex, 30 to 50 percent slopes, very stony

Setting

Landscape: Low and intermediate mountains, dominantly in the southeastern part of the county

Elevation range: 2,700 to 3,200 feet

Landform: Coves, colluvial fans, drainageways, and benches

Landform position: Head slopes and footslopes

Shape of areas: Long and narrow or irregular

Size of areas: Up to 20 acres

Composition

Northcove soil and similar inclusions: 45 percent

Maymead soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Northcove

Surface layer:
0 to 3 inches—dark grayish brown very cobbly loam

Subsoil:
3 to 60 inches—brownish yellow very cobbly sandy loam

Underlying material:
60 to 80 inches—light yellowish brown very cobbly sandy loam

Maymead

Surface layer:
0 to 5 inches—very dark grayish brown loam

Subsoil:
5 to 80 inches—brown cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Northcove—loamy with many rock fragments; Maymead—loamy
Permeability: Moderately rapid
Available water capacity: Maymead—moderate; Northcove—low or moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Northcove—medium; Maymead—low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Moderate or high
Potential frost action: Northcove—low; Maymead—moderate
Special climatic conditions: Soils subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Northcove—extremely acid to moderately acid throughout the profile; Maymead—very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; high content of rock fragments in the Northcove soil; soil slippage potential when soil is saturated

Minor Components

Dissimilar inclusions:
- Areas of rubble land; below rock outcrops and in drainageways

- Random areas of soils that have more clay in the subsoil
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and on toeslopes
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways, and on the outer edge of map unit delineations
- Random areas of soils on less than 30 percent or greater than 50 percent slopes

Similar inclusions:
- Maymead soils that have fine sandy loam and loam surface layers
- Northcove soils that have fine sandy loam and loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, building site development, and pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and very stony surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- The slope and surface stones limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, very stony surface, and the high content of rock fragments in the Northcove soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: High for cove hardwoods
Suitability: Suited
Management concerns: Equipment use and erodibility
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.

- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Northcove—unsuited; Maymead—poorly suited
Management concerns: Northcove—slope, large stones, erodibility, seeps and springs, corrosivity, and cutbanks cave; Maymead—slope, large stones, erodibility, seeps and springs, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Large stones and boulders will be encountered during excavation.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Northcove—unsuited; Maymead—poorly suited
Management concerns: Northcove—large stones, slope, seeps and springs, and poor filtering capacity; Maymead—large stones, slope, and seeps and springs
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Large stones and boulders will be encountered during excavation.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Northcove soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Poorly suited
Management concerns: Northcove—slope, erodibility, large stones, seeps and springs, and differential settling; Maymead—slope, erodibility, large stones, seeps and springs, and frost action

Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Large stones and boulders will be encountered during excavation.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- The Northcove soil is subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, large stones, climate, pesticide retention, and soil fertility
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, very stony surface, and the high content of rock fragments in the Northcove soil.
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: Northcove—7s; Maymead—6s

OwC—Oconaluftee-Guyot-Cataloochee complex, windswept, 8 to 15 percent slopes, bouldery

Setting

Landscape: High mountains in the Sandymush Bald area, in the northwestern part of the county
Elevation range: 4,600 to 5,200 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow or irregular
Size of areas: Up to 2 acres

Composition

Oconaluftee soil and similar inclusions: 45 percent
Guyot soil and similar inclusions: 25 percent

Cataloochee soil and similar inclusions: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Oconaluftee

Surface layer:
0 to 12 inches—very dark brown channery loam

Subsoil:
12 to 44 inches—dark yellowish brown channery loam

Underlying material:
44 to 80 inches—multicolored fine sandy loam saprolite

Guyot

Surface layer:
0 to 11 inches—very dark brown clay loam

Subsoil:
11 to 28 inches—yellowish brown fine sandy loam

Underlying material:
28 to 54 inches—variegated fine sandy loam saprolite in shades of brown, yellow, gray, and white

Bedrock:
54 to 80 inches—weathered interbedded metasandstone and phyllite

Cataloochee

Surface layer:
0 to 9 inches—very dark brown clay loam

Subsoil:
9 to 19 inches—dark yellowish brown channery loam

Underlying material:
19 to 31 inches—dark yellowish brown channery fine sandy loam saprolite

Bedrock:
31 to 80 inches—weathered interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Oconaluftee—very deep; Guyot—deep; Cataloochee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate in the surface layer and moderately rapid in the subsoil and underlying material
Available water capacity: Oconaluftee and Guyot—moderate; Cataloochee—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart

Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Oconaluftee—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the B and C horizons; Guyot—extremely acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid in the C horizon; Cataloochee—ultra acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid or strongly acid in the C horizon
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Oconaluftee—more than 60 inches; Guyot—40 to 60 inches to soft bedrock; Cataloochee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Chiltoskie soils that have a loamy subsoil and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in saddles and gaps
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Oconaluftee soils that have fine sandy loam, sandy loam, and clay loam surface layers
- Guyot and Cataloochee soils that have fine sandy loam, sandy loam, and loam surface layers

Land Use

Dominant Uses: Pasture and wildlife habitat
Other Uses: Recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, short growing season, and bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Oconaluftee and Guyot—equipment use, erodibility, climate, pesticide retention, soil fertility, and rooting depth; Cataloochee—equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- This map unit is limited for pasture and hayland because of the slope, erodibility, bouldery surface, damaging high winds, and short growing season.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.

- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Cataloochee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of damaging high winds, a short growing season, a bouldery surface, and the depth to bedrock and droughtiness of the Cataloochee soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of damaging high winds, a short growing season, a bouldery surface, and the depth to bedrock of the Cataloochee soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Oconaluftee—slope, erodibility, climate, and corrosivity; Guyot and Cataloochee—slope, erodibility, climate, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures so that they conform to natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Design modifications are needed to overcome prolonged freezing temperatures and damaging high winds.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Oconaluftee—slope and climate; Guyot and Cataloochee—slope, climate, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Design modifications are needed to overcome prolonged freezing temperatures.
- Locating and using areas of the deeper Oconaluftee soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Oconaluftee—slope, erodibility, and frost action; Guyot and Cataloochee—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Oconaluftee and Guyot—slope, erodibility, climate, pesticide retention, soil fertility, and depth to bedrock; Cataloochee—slope, erodibility, climate, pesticide retention, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Due to a short growing season, the use of native, winter-hardy landscape plants is recommended.
- This map unit is subject to damaging high winds and may be unsuitable for some types of landscaping.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cataloochee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Groups

Land capability classification: 4s

OwD—Oconaluftee-Guyot-Cataloochee complex, windswept, 15 to 30 percent slopes, bouldery

Setting

Landscape: High mountains in the Sandymush Bald area, in the northwestern part of the county
Elevation range: 4,600 to 5,200 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: Up to 8 acres

Composition

Oconaluftee soil and similar inclusions: 45 percent
Guyot soil and similar inclusions: 25 percent
Cataloochee soil and similar inclusions: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Oconaluftee

Surface layer:
0 to 12 inches—very dark brown channery loam

Subsoil:
12 to 44 inches—dark yellowish brown channery loam

Underlying material:
44 to 80 inches—multicolored fine sandy loam saprolite

Guyot

Surface layer:
0 to 11 inches—very dark brown clay loam

Subsoil:
11 to 28 inches—yellowish brown fine sandy loam

Underlying material:
28 to 54 inches—variegated fine sandy loam saprolite in shades of brown, yellow, gray, and white

Bedrock:
54 to 80 inches—weathered interbedded metasandstone and phyllite

Cataloochee

Surface layer:
0 to 9 inches—very dark brown clay loam

Subsoil:
9 to 19 inches—dark yellowish brown channery loam

Underlying material:
19 to 31 inches—dark yellowish brown channery fine sandy loam saprolite

Bedrock:
31 to 80 inches—weathered interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Oconaluftee—very deep; Guyot—deep; Cataloochee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate in the surface layer and moderately rapid the subsoil and underlying material
Available water capacity: Oconaluftee and Guyot—moderate; Cataloochee—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Oconaluftee—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the B and C horizons; Guyot—extremely acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid in the C horizon; Cataloochee—ultra acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid or strongly acid in the C horizon
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Oconaluftee—more than 60 inches; Guyot—40 to 60 inches to soft bedrock; Cataloochee—20 to 40 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Chiltoskie soils that have a loamy subsoil and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in saddles and gaps
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Oconaluftee soils that have fine sandy loam, sandy loam, and clay loam surface layers
- Guyot and Cataloochee soils that have fine sandy loam, sandy loam, and loam surface layers

Land Use

Dominant Uses: Pasture and wildlife habitat
Other Uses: Recreation

Agricultural Development

Cropland

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, bouldery surface, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Oconaluftee and Guyot—equipment use, erodibility, climate, pesticide retention, soil fertility, and rooting depth; Cataloochee—equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- This map unit is limited for pasture and hayland because of the slope, erodibility, bouldery surface, damaging high winds, and short growing season.
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Cataloochee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of damaging high winds, a short growing season, a bouldery surface, and the depth to bedrock and droughtiness of the Cataloochee soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of damaging high winds, a short growing season, low productivity, a bouldery surface, and the depth to bedrock of the Cataloochee soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Oconaluftee—slope, erodibility, climate, and corrosivity; Guyot and Cataloochee—slope, erodibility, climate, corrosivity, and depth to bedrock

Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Design modifications are needed to overcome prolonged freezing temperatures and damaging high winds.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Oconaluftee—slope and climate; Guyot and Cataloochee—slope, climate, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Design modifications are needed to overcome prolonged freezing temperatures.
- Locating and using areas of the deeper Oconaluftee soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Oconaluftee—slope, erodibility, and frost action; Guyot and Cataloochee—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Oconaluftee and Guyot—slope, erodibility, climate, pesticide retention, soil fertility, and depth to bedrock; Cataloochee—slope, erodibility, climate, pesticide retention, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Due to a short growing season, the use of native, winter-hardy landscape plants is recommended.
- This map unit is subject to damaging high winds and may be unsuitable for some types of landscaping.
- These soils may retain soil-applied herbicides and other pesticides due to the high

content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cataloochee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Groups

Land capability classification: 6s

OwE—Oconaluftee-Guyot-Cataloochee complex, windswept, 30 to 50 percent slopes, bouldery

Setting

Landscape: High mountains in the Sandymush Bald area, in the northwestern part of the county
Elevation range: 4,600 to 5,200 feet
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow or irregular
Size of areas: Up to 18 acres

Composition

Oconaluftee soil and similar inclusions: 35 percent
Guyot soil and similar inclusions: 30 percent
Cataloochee soil and similar inclusions: 25 percent
Dissimilar inclusions: 10 percent

Typical Profile

Oconaluftee

Surface layer:
0 to 12 inches—very dark brown channery loam

Subsoil:
12 to 44 inches—dark yellowish brown channery loam

Underlying material:
44 to 80 inches—multicolored fine sandy loam saprolite

Guyot

Surface layer:
0 to 11 inches—very dark brown clay loam

Subsoil:
11 to 28 inches—yellowish brown fine sandy loam

Underlying material:
28 to 54 inches—variegated fine sandy loam saprolite in shades of brown, yellow, gray, and white

Bedrock:
54 to 80 inches—weathered interbedded metasandstone and phyllite

Cataloochee

Surface layer:
0 to 9 inches—very dark brown clay loam

Subsoil:
9 to 19 inches—dark yellowish brown channery loam

Underlying material:
19 to 31 inches—dark yellowish brown channery fine sandy loam saprolite

Bedrock:
31 to 80 inches—weathered interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Oconaluftee—very deep; Guyot—deep; Cataloochee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate in the surface layer and moderately rapid the subsoil and underlying material
Available water capacity: Oconaluftee and Guyot—moderate; Cataloochee—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Oconaluftee—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the B and C horizons; Guyot—extremely acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid in the C horizon; Cataloochee—ultra acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid or strongly acid in the C horizon
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Oconaluftee—more than 60 inches; Guyot—40 to 60 inches to soft bedrock; Cataloochee—20 to 40 inches to soft bedrock
Other distinctive properties: Potential for downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of soils that have a high mica content in the subsoil and underlying material
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Heintooga soils that have more rock fragments in the subsoil; in concave areas at the head of drains and in drainageways
- Chiltoskie soils that have a loamy subsoil and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in drainageways
- Random areas of soils on less than 30 percent or greater than 50 percent slopes

Similar inclusions:
- Oconaluftee soils that have fine sandy loam, sandy loam, and clay loam surface layers
- Guyot and Cataloochee soils that have fine sandy loam, sandy loam, and loam surface layers

Land Use

Dominant Uses: Wildlife habitat
Other Uses: Pasture and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, bouldery surface, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Oconaluftee and Guyot—equipment use, erodibility, climate, pesticide retention, soil fertility, and rooting depth; Cataloochee—equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- This map unit is severely limited for pasture and hayland because of the slope, erodibility, bouldery surface, damaging high winds, and short growing season.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Cataloochee soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, damaging high winds, short growing season, bouldery surface, and the depth to bedrock and droughtiness of the Cataloochee soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of damaging high winds, a short growing season, low productivity, a bouldery surface, and the depth to bedrock of the Cataloochee soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Oconaluftee—slope, erodibility, climate, and corrosivity; Guyot and Cataloochee—slope, erodibility, climate, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Design modifications are needed to overcome prolonged freezing temperatures and damaging high winds.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Oconaluftee—slope and climate; Guyot and Cataloochee—slope, climate, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Design modifications are needed to overcome prolonged freezing temperatures.
- Locating and using areas of the deeper Oconaluftee soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Oconaluftee—slope, erodibility, and frost action; Guyot and Cataloochee—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.

- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Oconaluftee and Guyot—slope, erodibility, climate, pesticide retention, soil fertility, and depth to bedrock; Cataloochee—slope, erodibility, climate, pesticide retention, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Due to a short growing season, the use of native, winter-hardy landscape plants is recommended.
- This map unit is subject to damaging high winds and may be unsuitable for some types of landscaping.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Cataloochee soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Groups

Land capability classification: 7s

OwF—Oconaluftee-Guyot-Cataloochee complex, windswept, 50 to 95 percent slopes, bouldery

Setting

Landscape: High mountains in the Sandymush Bald area, in the northwestern part of the county
Elevation range: 4,600 to 5,200 feet
Landform: Mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 42 acres

Composition

Oconaluftee soil and similar inclusions: 35 percent

Guyot soil and similar inclusions: 30 percent
Cataloochee soil and similar inclusions: 25 percent
Dissimilar inclusions: 10 percent

Typical Profile

Oconaluftee

Surface layer:
0 to 12 inches—very dark brown channery loam

Subsoil:
12 to 44 inches—dark yellowish brown channery loam

Underlying material:
44 to 80 inches—multicolored fine sandy loam saprolite

Guyot

Surface layer:
0 to 11 inches—very dark brown clay loam

Subsoil:
11 to 28 inches—yellowish brown fine sandy loam

Underlying material:
28 to 54 inches—variegated fine sandy loam saprolite in shades of brown, yellow, gray, and white

Bedrock:
54 to 80 inches—weathered interbedded metasandstone and phyllite

Cataloochee

Surface layer:
0 to 9 inches—very dark brown clay loam

Subsoil:
9 to 19 inches—dark yellowish brown channery loam

Underlying material:
19 to 31 inches—dark yellowish brown channery fine sandy loam saprolite

Bedrock:
31 to 80 inches—weathered interbedded metasandstone and phyllite

Soil Properties and Qualities

Depth class: Oconaluftee—very deep; Guyot—deep; Cataloochee—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate in the surface layer and moderately rapid the subsoil and underlying material
Available water capacity: Oconaluftee and Guyot—moderate; Cataloochee—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe

Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Oconaluftee—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the B and C horizons; Guyot—extremely acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid in the C horizon; Cataloochee—ultra acid in the A horizon, extremely acid or very strongly acid in the B horizon, and very strongly acid or strongly acid in the C horizon
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Oconaluftee—more than 60 inches; Guyot—40 to 60 inches to soft bedrock; Cataloochee—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of soils that have a high mica content in the subsoil and underlying material
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Heintooga soils with more rock fragments in the subsoil; in concave areas at the head of drains and in drainageways
- Chiltoskie soils that have a loamy subsoil and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in drainageways
- Random areas of soils on less than 50 percent or greater than 95 percent slopes

Similar inclusions:
- Oconaluftee soils that have fine sandy loam, sandy loam, and clay loam surface layers
- Guyot and Cataloochee soils that have fine sandy loam, sandy loam, and loam surface layers

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, bouldery surface, damaging high winds, short growing season, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, bouldery surface, damaging high winds, short

growing season, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, bouldery surface, damaging high winds, short growing season, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of damaging high winds, a short growing season, low productivity, a bouldery surface, and depth to bedrock. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, damaging high winds, prolonged freezing temperatures, bouldery surface, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope, prolonged freezing temperatures, bouldery surface, and depth to bedrock. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, bouldery surface, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, damaging high winds, short growing season, bouldery surface, and depth to bedrock. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7s

Pg—Pits, gravel, occasionally flooded

This map unit consists of borrow pits mined for gravel, cobbles, and stone in or near flood plains. No interpretations are given for this map unit.

Pt—Pits, quarry

This map unit consists of areas quarried for stone from bedrock in areas scattered throughout the county but dominantly in the central and southern portions. No interpretations are given for this map unit

PwC—Porters-Unaka complex, 8 to 15 percent slopes, stony

Setting

Landscape: Low and intermediate mountains in the western and eastern parts of the county
Elevation range: 2,800 to 4,900 feet
Landform: North- to east-facing ridges and those shaded by the higher mountains
Landform position: Summits
Shape of areas: Long and narrow
Size of areas: Up to 103 acres

Composition

Porters soil and similar inclusions: 50 percent
Unaka soil and similar inclusions: 35 percent
Dissimilar inclusions: 15 percent

Typical Profile

Porters

Surface layer:
0 to 9 inches—dark brown loam

Subsoil:
9 to 54 inches—dark yellowish brown gravelly loam

Bedrock:
54 to 80 inches—unweathered hard biotite gneiss

Unaka

Surface layer:
0 to 8 inches—very dark brown loam

Subsoil:
8 to 13 inches—dark yellowish brown loam
13 to 26 inches—yellowish brown cobbly loam

Bedrock:
26 to 31 inches—weathered highly fractured biotite gneiss
31 to 80 inches—unweathered hard, moderately fractured biotite gneiss

Soil Properties and Qualities

Depth class: Porters—deep; Unaka—moderately deep

Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Porters—moderate; Unaka—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, allowing for late spring and early fall frosts, and to higher soil moisture content due to north- to east-facing aspects or shading by the higher mountains
Soil reaction: Porters—very strongly acid to slightly acid throughout the profile; Unaka—very strongly acid or strongly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Porters—40 to 60 inches to hard bedrock; Unaka—20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have soft bedrock at a depth of 40 to more than 60 inches
- Tate soils that have more clay in the subsoil and have bedrock at a depth of more than 60 inches; in saddles and gaps
- Chestnut, Buladean, and Edneyville soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes
- Random areas of soils on less than 8 percent or greater than 15 percent slopes
- Widely scattered areas of rock outcrop
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Porters and Unaka soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, pasture, and building site development

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Porters—erodibility, equipment use, soil fertility, pesticide

retention, and depth to bedrock; Unaka—erodibility, equipment use, soil fertility, pesticide retention, depth to bedrock, and droughtiness

- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Because of the low available water capacity due to the moderately deep rooting depth, the Unaka soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Well suited
Management concerns: Porters—erodibility, equipment use, pesticide retention, soil fertility, and rooting depth; Unaka—erodibility, equipment use, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:

- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Unaka soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Porters—suited; Unaka—poorly suited
Management concerns: Porters—erodibility, equipment use, pesticide retention, ball and burlap harvesting, climate, soil fertility, and rooting depth; Unaka—erodibility, equipment use, pesticide retention, ball and burlap harvesting, climate, soil fertility, rooting depth, and droughtiness
Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- These soils may retain soil-applied herbicides and other pesticides due to the high

content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential that late spring frost will damage new growth in some years.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- In areas where water concentrates, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow due to the moderately deep rooting depth, the Unaka soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Well suited
Management concerns: Porters—erodibility, equipment use, and pesticide retention; Unaka—erodibility, equipment use, pesticide retention, and windthrow hazard
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Unaka soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Depth to bedrock, slope, erodibility, and corrosivity
Management measures and considerations:
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of these soils.
- Designing structures so that they conform to natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible or constructing silt fences helps to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Depth to bedrock and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Locating and using areas of the deeper Porters soil may improve the performance of filter fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Depth to bedrock, frost action, slope, and erodibility
Management measures and considerations:
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

Lawns and landscaping

Suitability: Suited
Management concerns: Porters—slope, erodibility, pesticide retention, soil fertility, climate, and depth to bedrock; Unaka—slope, erodibility, pesticide retention, soil fertility, climate, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- The use of native, winter-hardy landscape plants is recommended.
- Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential that late spring frost will damage new growth in some years.
- In areas where water concentrates, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Unaka soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Groups

Land capability classification: 3e

PwD—Porters-Unaka complex, 15 to 30 percent slopes, stony

Setting

Landscape: Low and intermediate mountains in the western and eastern parts of the county
Elevation range: 2,800 to 4,900 feet
Landform: North- to east-facing ridges and those shaded by the higher mountains
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: Up to 142 acres

Composition

Porters soil and similar inclusions: 50 percent
Unaka soil and similar inclusions: 35 percent
Dissimilar inclusions: 15 percent

Typical Profile

Porters

Surface layer:
0 to 9 inches—dark brown loam

Subsoil:
9 to 54 inches—dark yellowish brown gravelly loam

Bedrock:
54 to 80 inches—unweathered hard biotite gneiss

Unaka

Surface layer:
0 to 8 inches—very dark brown loam

Subsoil:
8 to 13 inches—dark yellowish brown loam
13 to 26 inches—yellowish brown cobbly loam

Bedrock:
26 to 31 inches—weathered highly fractured biotite gneiss
31 to 80 inches—unweathered hard, moderately fractured biotite gneiss

Soil Properties and Qualities

Depth class: Porters—deep; Unaka—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Porters—moderate; Unaka—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe

Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, allowing for late spring and early fall frosts, and to higher soil moisture content due to north- to east-facing aspects or shading by the higher mountains
Soil reaction: Porters—very strongly acid to slightly acid throughout the profile; Unaka—very strongly acid or strongly acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Porters—40 to 60 inches to hard bedrock; Unaka—20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 60 inches
- Random areas of soils that have more mica in the subsoil and have soft bedrock at a depth of 40 to more than 60 inches
- Tate and Tusquitee soils that have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Chestnut, Buladean, and Edneyville soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to more than 60 inches; on south- to west-facing shoulder slopes, nose slopes, and side slopes
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round
- Widely scattered areas of rock outcrop; on narrow ridges

Similar inclusions:
- Porters and Unaka soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, pasture, and building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Porters—equipment use, erodibility, soil fertility, pesticide retention, and depth to bedrock; Unaka—equipment use, erodibility, soil fertility, pesticide retention, depth to bedrock, and droughtiness
- These soils are difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.

- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Because of the low available water capacity due to the moderately deep rooting depth, the Unaka soil is difficult to manage for cultivated crops.

Pasture and hayland

Suitability: Suited
Management concerns: Porters—equipment use, erodibility, pesticide retention, soil fertility, and rooting depth; Unaka—equipment use, erodibility, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Unaka soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Porters—suited; Unaka—poorly suited
Management concerns: Porters—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, and rooting depth; Unaka—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential that late spring frost will damage new growth in some years.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- In areas where water concentrates, such as drainageways, Fraser fir and other

ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Unaka soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Porters—erodibility, equipment use, and pesticide retention; Unaka—erodibility, equipment use, pesticide retention, and windthrow hazard
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Unaka soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, depth to bedrock, erodibility, and corrosivity
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of these soils.
- Vegetating cleared and graded areas as soon as possible or constructing silt fences helps to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Porters soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited

Management concerns: Slope, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Porters—slope, erodibility, pesticide retention, soil fertility, climate, and depth to bedrock; Unaka—slope, erodibility, pesticide retention, soil fertility, climate, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- The use of native, winter-hardy landscape plants is recommended.
- Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential that late spring frost will damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the mderately deep rooting depth, the Unaka soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Groups

Land capability classification: 4e

PwE—Porters-Unaka complex, 30 to 50 percent slopes, stony

Setting

Landscape: Low and intermediate mountains, in the western and eastern parts of the county
Elevation range: 2,800 to 4,900 feet
Landform: North- to east-facing ridges and mountain slopes and those shaded by the higher mountains
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 131 acres

Composition

Porters soil and similar inclusions: 50 percent
Unaka soil and similar inclusions: 30 percent
Dissimilar inclusions: 20 percent

Typical Profile

Porters

Surface layer:
0 to 9 inches—dark brown loam

Subsoil:
9 to 54 inches—dark yellowish brown gravelly loam

Bedrock:
54 to 80 inches—unweathered hard biotite gneiss

Unaka

Surface layer:
0 to 8 inches—very dark brown loam

Subsoil:
8 to 13 inches—dark yellowish brown loam
13 to 26 inches—yellowish brown cobbly loam

Bedrock:
26 to 31 inches—weathered highly fractured biotite gneiss
31 to 80 inches—unweathered hard, moderately fractured biotite gneiss

Soil Properties and Qualities

Depth class: Porters—deep; Unaka—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Porters—moderate; Unaka—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, allowing for late spring and early fall frosts, and to higher soil moisture content due to north- to east-facing aspects or shading by the higher mountains
Soil reaction: Porters—very strongly acid to slightly acid throughout the profile; Unaka—very strongly acid or strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Porters—40 to 60 inches to hard bedrock; Unaka—20 to 40 inches to hard bedrock

Other distinctive properties: Water movement along bedrock contacts: potential for downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 60 inches
- Tate and Tusquitee soils that have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Chestnut, Buladean, and Edneyville soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to more than 60 inches; on south- to west-facing spur ridges, nose slopes, and side slopes
- Widely scattered areas of rock outcrop
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Porters and Unaka soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, pasture, and building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Porters—equipment use, erodibility, pesticide retention, soil fertility, and rooting depth; Unaka—equipment use, erodibility, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting

depth, the Unaka soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Porters—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, and rooting depth; Unaka—equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential that late spring frost will damage new growth in some years.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Unaka soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Porters—equipment use, erodibility, and pesticide retention; Unaka—equipment use, erodibility, pesticide retention, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.

- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Unaka soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, depth to bedrock, erodibility, and corrosivity
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of these soils.
- Vegetating cleared and graded areas as soon as possible or constructing silt fences helps to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Depth to bedrock and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Locating and using areas of the deeper Porters soil may improve the performance of filter fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, frost action, and seeps and springs
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Porters—slope, erodibility, pesticide retention, soil fertility, climate, and depth to bedrock; Unaka—slope, erodibility, pesticide retention, soil fertility, climate, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control

structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- The use of native, winter-hardy landscape plants is recommended.
- Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential that late spring frost will damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Unaka soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Groups

Land capability classification: 6e

PxF—Porters-Unaka complex, 50 to 95 percent slopes, rocky

Setting

Landscape: Low and intermediate mountains, in the western and eastern parts of the county
Elevation range: 2,800 to 4,900 feet
Landform: North- to east-facing mountain slopes and those shaded by the higher mountains
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 65 acres

Composition

Porters soil and similar inclusions: 50 percent
Unaka soil and similar inclusions: 35 percent
Dissimilar inclusions: 15 percent

Typical Profile

Porters

Surface layer:
0 to 9 inches—dark brown loam

Subsoil:
9 to 54 inches—dark yellowish brown gravelly loam

Bedrock:
54 to 80 inches—unweathered hard biotite gneiss

Unaka

Surface layer:
0 to 8 inches—very dark brown loam

Subsoil:
8 to 13 inches—dark yellowish brown loam
13 to 26 inches—yellowish brown cobbly loam

Bedrock:
26 to 31 inches—weathered highly fractured biotite gneiss
31 to 80 inches—unweathered hard, moderately fractured biotite gneiss

Soil Properties and Qualities

Depth class: Porters—deep; Unaka—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Porters—moderate; Unaka—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Extent of rock outcrop: About 2 percent on the soil surface
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to cooler annual air temperatures, allowing for late spring and early fall frosts, and to higher soil moisture content due to north- to east-facing aspects or shading by the higher mountains
Soil reaction: Porters—very strongly acid to slightly acid throughout the profile; Unaka—very strongly acid or strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Porters—40 to 60 inches to hard bedrock; Unaka—20 to 40 inches to hard bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed; water movement along bedrock contacts

Minor Components

Dissimilar inclusions:
- Random areas of soils that have bedrock at a depth of more than 60 inches
- Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Chestnut, Buladean, and Edneyville soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to more than 60 inches; on south- to west-facing spur ridges, nose slopes, and side slopes

- Random areas of soils on less than 50 percent or greater than 95 percent slopes
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Porters and Unaka soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Poorly suited
Management concerns: Porters—equipment use, erodibility, and pesticide retention; Unaka—equipment use, erodibility, pesticide retention, and windthrow hazard
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Unaka soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth

to bedrock, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, and extent of rock outcrops. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7s

RdA—Reddies sandy loam, 0 to 3 percent slopes, occasionally flooded

Setting

Landscape: Mountain valleys in low and intermediate mountains throughout the county
Elevation range: 1,700 to 2,300 feet
Landform: Flood plains dominantly at the upper end of mountain valleys
Landform position: Planar to slightly convex bottomland slopes
Shape of areas: Long and narrow
Size of areas: Up to 63 acres

Composition

Reddies soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 14 inches—very dark grayish brown sandy loam

Subsoil:
14 to 26 inches—dark yellowish brown fine sandy loam

Underlying material:
26 to 80 inches—variegated very gravelly sand in shades of brown, yellow, gray, and white

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Moderately well drained
General texture class: Loamy in the upper part and sandy or sandy-skeletal in the lower part
Permeability: Moderately rapid in the surface layer and subsoil and rapid or very rapid in the underlying material
Available water capacity: Very low
Depth to seasonal high water table: 2.0 to 3.5 feet from December through May and 2.5 to 4.0 feet from June through November
Hazard of flooding: Occasional, throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: High
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to neutral throughout the profile
Parent material: Alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Depth to contrasting material: 20 to 40 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Other distinctive properties: Soil subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:
- Soils that have a rare flood hazard; on the wider flood plains
- Soils that are well drained to excessively well drained; in the wider units and those adjacent to deeper stream channels
- Somewhat poorly drained French and poorly drained Nikwasi soils that have a subsoil that is loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; in depressions, old stream channels, and backwater areas
- Dellwood soils that are 8 to 20 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
- Well drained Rosman soils that have strata with a high content of rock fragments at a depth of more than 40 inches; in the slightly higher-lying positions
- Moderately well drained Dillard soils that have more clay and fewer rock fragments in the subsoil; on low stream terraces and toeslopes
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways
- Random areas of soils on greater than 3 percent slopes

Similar inclusions:
- Reddies soils that have fine sandy loam and loam surface layers

Land Use

Dominant Uses: Cropland and ornamental crops
Other Uses: Pasture, hayland, recreation, and wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, and climate
Management measures and considerations:
- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Using conservation tillage, winter cover crops, crop residue management, and crop rotations which include grasses and legumes, helps to increase the available water capacity and improve soil fertility.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- Using frequent and light applications of irrigation water helps to avoid the leaching of plant nutrients below the rooting zone.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, and erodibility
Management measures and considerations:
- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase crop production.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Unsuited to orchards; poorly suited to ornamental crops
Management concerns: Flooding, droughtiness, root disease, climate, soil fertility, nutrient leaching, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- Because of the potential for flooding, this soil can be difficult to manage for orchard or ornamental crops.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Due to the seasonal high water table and flooding, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes and drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- Using frequent and light applications of irrigation water helps to avoid the leaching of plant nutrients below the rooting zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods
Suitability: Well suited
Management concerns: Flooding and pesticide retention
Management measures and considerations:
- The potential for flooding is a consideration in the placement of haul roads and log landings.
- Soil-applied herbicides are retained due to herbicide-organic matter bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the flooding and wetness. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the wetness and poor filtering capacity. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, root disease, and climate
Management measures and considerations:
- Because of the flooding, this soil is difficult to manage and has severe limitations during periods of inundation.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants. Using split applications of lime and fertilizer helps to increase their effectiveness.
- Using frequent and light applications of irrigation water helps to avoid the leaching of plant nutrients below the rooting zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Due to the seasonal high water table and flooding, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes and drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Interpretive Groups

Land capability classification: 2w

RkF—Rock outcrop-Cleveland complex, 30 to 95 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains, dominantly in the southwestern part of the county
Elevation range: 1,800 to 4,500 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 69 acres

Composition

Rock outcrop: 60 percent
Cleveland soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Rock outcrop

The Rock outcrop is dominantly granite and biotite gneiss bedrock.

Cleveland

Surface layer:
0 to 5 inches—dark brown sandy loam

Subsoil:
5 to 14 inches—dark yellowish brown sandy loam

Bedrock:
14 to 80 inches—unweathered hard biotite gneiss

Properties and Qualities of the Cleveland Soil

Depth class: Shallow
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep or very steep
Soil slippage potential: High
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: 10 to 20 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; soil slippage potential when soil is saturated

Minor Components

Dissimilar inclusions:
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Areas of soils that have hard bedrock at a depth of 1 to 10 inches; adjacent to rock outcrops

Figure 14.—An area of Rock outcrop-Cleveland complex, 30 to 95 percent slopes, very bouldery. In this map unit, very steep slopes and depth to bedrock limit accessibility and land use potential.

- Random areas of soils that have bedrock at a depth of more than 20 inches
- Random areas of soils on less than 30 percent or greater than 95 percent slopes
- Random areas where landslides have occurred
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Cleveland soils that have fine sandy loam surface layers

Land Use

Dominant Uses: Wildlife habitat (fig. 14)

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for pasture and hay production because of the

slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, low volume, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Rock outcrop—8s; Cleveland—7s

RoF—Rock outcrop-Oteen complex, 30 to 95 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains, dominantly along the French Broad River gorge in the south-central part of the county
Elevation range: 1,700 to 2,200 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 571 acres

Composition

Rock outcrop: 60 percent
Oteen soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Rock outcrop

The Rock outcrop is dominantly migmatitic gneiss bedrock.

Oteen

Surface layer:
0 to 2 inches—dark brown fine sandy loam

Subsoil:
2 to 11 inches—dark yellowish brown fine sandy loam

Underlying material:
11 to 15 inches—dark yellowish brown very gravelly sandy loam saprolite

Bedrock:
15 to 80 inches—weathered migmatitic gneiss bedrock

Properties and Qualities of the Oteen Soil

Depth class: Shallow
Drainage class: Somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep or very steep
Soil slippage potential: High
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid or strongly acid in the A horizon and strongly acid to neutral throughout the rest of the profile

Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: 10 to 20 inches to soft bedrock
Other distinctive properties: Soil subject to downslope movement when lateral support is removed; soil slippage potential when soil is saturated

Minor Components

Dissimilar inclusions:
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; on toeslopes, on benches, in saddles, in gaps, in concave areas at the head of drains, and on footslopes
- Soils that have hard bedrock at a depth of 1 to 10 inches; adjacent to rock outcrops
- Random areas of soils that have bedrock at a depth of more than 20 inches
- Random areas of soils on less than 30 percent or greater than 95 percent slopes
- Random areas where landslides have occurred

Similar inclusions:
- Oteen soils that have sandy loam or loam surface layers

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, low volume, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Rock outcrop—8s; Oteen—7s

RsA—Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded

Setting

Landscape: Mountain valleys of intermountain hills; low and intermediate mountains, dominantly along the Cane, Hominy, Reems, and Newfound Creeks and the French Broad and Swannanoa Rivers
Elevation range: 1,700 to 2,300 feet
Landform: Flood plains
Landform position: Planar to slightly convex bottomland slopes
Shape of areas: Long and narrow or irregular on wider flood plains
Size of areas: Up to 127 acres

Composition

Rosman soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 10 inches—very dark brown fine sandy loam

Subsoil:
10 to 59 inches—yellowish brown fine sandy loam

Underlying material:
59 to 80 inches—dark yellowish brown and grayish brown fine sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: 3.5 to greater than 5.0 feet from January through December
Hazard of flooding: Occasional, throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: High
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Strongly acid to moderately acid throughout the profile
Parent material: Alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Depth to contrasting material: More than 40 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Other distinctive properties: Soil subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:
- Soils that have a rare flood hazard; on the wider flood plains
- Somewhat poorly drained French and poorly drained Nikwasi soils that have a subsoil that is loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Well drained Biltmore soils that have a sandy subsoil; on streambanks and along sharp river bends
- Somewhat poorly drained soils that have a loamy subsoil; in depressions, old stream channels, and backwater areas
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and are 8 to 40 inches to strata with a high content of rock fragments; along stream channels
- Moderately well drained Dillard soils that have more clay in the subsoil; on low stream terraces and toeslopes
- Well drained Tate and Statler soils that have more clay in the subsoil; on toeslopes and low terraces

- Poorly drained Hemphill soils that have a clayey subsoil; in depressions and backwater areas
- Random areas of soils on slopes of more than 3 percent

Similar inclusions:
- Rosman soils that have sandy loam, loam, and silt loam surface layers

Land Use

Dominant Uses: Cropland and ornamental crops
Other Uses: Pasture, hayland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Flooding, droughtiness, soil fertility, nutrient leaching, pesticide retention, and climate
Management measures and considerations:
- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Using conservation tillage, winter cover crops, crop residue management, and crop rotations which include grasses and legumes helps to increase the available water capacity and improve soil fertility.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity. Using split applications of lime and fertilizer helps to increase their effectiveness.
- Frequent and light applications of irrigation water help to avoid the leaching of plant nutrients below the rooting zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, and erodibility
Management measures and considerations:
- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Using supplemental irrigation and crop varieties adapted to droughty conditions helps to increase crop production.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the

availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications helps to increase the effectiveness of fertilizer.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Unsuited to orchards; suited to ornamental crops
Management concerns: Flooding, droughtiness, climate, soil fertility, nutrient leaching, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- Because of the potential for flooding, this soil can be difficult to manage for ornamental crops.
- This soil has a low available water capacity and becomes droughty during periods of low rainfall.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity. Split applications of lime and fertilizer helps to increase their effectiveness.
- Frequent and light applications of irrigation water help to avoid the leaching of plant nutrients below the rooting zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- Due to flooding, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes and drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for yellow-poplar and very high for eastern white pine
Suitability: Well suited
Management concerns: Flooding, seedling survival, and pesticide retention
Management measures and considerations:
- The potential for flooding is a consideration in the placement of haul roads and log landings.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the flooding and,

potentially, the seasonal high water table. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the flooding and, potentially, the seasonal high water table. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Suited
Management concerns: Flooding, droughtiness, pesticide retention, soil fertility, nutrient leaching, and climate
Management measures and considerations:
- Because of the flooding, this soil is difficult to manage and has severe limitations during periods of inundation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants. Using lime and fertilizer in split applications helps to increase their effectiveness.
- Frequent and light applications of irrigation water help to avoid the leaching of plant nutrients below the rooting zone.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Due to flooding, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes and drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: 2w

SoD—Soco-Stecoah complex, 15 to 30 percent slopes, stony

Setting

Landscape: Intermediate mountains in the northwest, near Sandymush Bald, and in the southeastern part of the county
Elevation range: 2,400 to 4,900 feet

Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: Up to 26 acres

Composition

Soco soil and similar inclusions: 50 percent
Stecoah soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Soco

Surface layer:
0 to 2 inches—very dark grayish brown fine sandy loam

Subsoil:
2 to 33 inches—yellowish brown fine sandy loam

Bedrock:
33 to 80 inches—weathered metasandstone

Stecoah

Surface layer:
0 to 2 inches—very dark grayish brown fine sandy loam

Subsoil:
2 to 47 inches—light yellowish brown sandy loam

Bedrock:
47 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Soco—moderately deep; Stecoah—deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Soco—20 to 40 inches to soft bedrock; Stecoah—40 to 60 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Maymead soils that have bedrock at a depth of more than 60 inches; in saddles and gaps and in concave areas at the head of drains
- Random areas of Junaluska and Brasstown soils that have more clay in the subsoil and have soft bedrock at a depth of 20 to 60 inches
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Widely scattered areas of rock outcrop
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Soco and Stecoah soils that have fine sandy loam, loam, and silt loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, hayland, building site development, and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Suited
Management concerns: Soco—equipment use, erodibility, soil fertility, rooting depth, and droughtiness; Stecoah—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Soco soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Soco—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness; Stecoah—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Soco soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Low for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Soco—equipment use, erodibility, and windthrow hazard; Stecoah—equipment use and erodibility
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited because of the limited rooting depth of the Soco soil.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Stecoah soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, low strength, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Soco—slope, erodibility, soil fertility, depth to bedrock, and droughtiness; Stecoah—slope, erodibility, soil fertility, and depth to bedrock
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- The use of native landscape plants that are tolerant of droughty, acidic soils is recommended.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Soco soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 4e

SoE—Soco-Stecoah complex, 30 to 50 percent slopes, stony

Setting

Landscape: Intermediate mountains in the northwest, near Sandymush Bald, and in the southeastern part of the county
Elevation range: 2,400 to 4,900 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 27 acres

Composition

Soco soil and similar inclusions: 45 percent
Stecoah soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Soco

Surface layer:
0 to 2 inches—very dark grayish brown fine sandy loam

Subsoil:
2 to 33 inches—yellowish brown fine sandy loam

Bedrock:
33 to 80 inches—weathered metasandstone

Stecoah

Surface layer:
0 to 2 inches—very dark grayish brown fine sandy loam

Subsoil:
2 to 47 inches—light yellowish brown sandy loam

Bedrock:
47 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Soco—moderately deep; Stecoah—deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart

Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Soco—20 to 40 inches to soft bedrock; Stecoah—40 to 60 inches to soft bedrock
Other distinctive properties: Potential for downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Maymead soils that have bedrock at a depth of more than 60 inches; on benches, on footslopes, and in concave areas at the head of drains
- Northcove soils that have more rock fragments in the subsoil and have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Cheoah and Jeffrey soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Random areas of Junaluska and Brasstown soils that have more clay in the subsoil and have soft bedrock at a depth of 20 to 60 inches
- Widely scattered areas of rock outcrop
- Random areas of soils on less than 30 percent or greater than 50 percent slopes

Similar inclusions:
- Soco and Stecoah soils that have fine sandy loam, loam, and silt loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Pasture, building site development, and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Soco—equipment use, erodibility, soil fertility, rooting depth, and droughtiness; Stecoah—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

- Because of the low available water capacity due to the moderately deep rooting depth, the Soco soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Soco—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, rooting depth, and droughtiness; Stecoah—equipment use, erodibility, soil fertility, ball and burlap harvesting, plant shape, and rooting depth
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during dry periods helps to prevent the fracture of the ball and the separation of the soil from the roots caused by the low moisture and minimal clay contents.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the low available water capacity and windthrow hazard due to the moderately deep rooting depth, the Soco soil is difficult to manage for orchard and ornamental crops.

Woodland Management and Productivity

Potential for commercial species: Low for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Soco—equipment use, erodibility, and windthrow hazard; Stecoah—equipment use and erodibility
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited because of the limited rooting depth of the Soco soil.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Locating and using areas of the deeper Stecoah soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, slippage, differential settling, depth to bedrock, low strength, and frost action
Management measures and considerations:
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- These soils are subject to uneven settling and may be unstable if not properly compacted.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited

Management concerns: Soco—slope, erodibility, droughtiness, soil fertility, and depth to bedrock; Stecoah—slope, erodibility, droughtiness, and soil fertility

Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- The use of native landscape plants that are tolerant of droughty, acidic soils is recommended.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Soco soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: 6e

SoF—Soco-Stecoah complex, 50 to 95 percent slopes, stony

Setting

Landscape: Intermediate mountains in the northwest, near Sandymush Bald, and in the southeastern part of the county

Elevation range: 2,400 to 4,900 feet

Landform: South- to west-facing mountain slopes

Landform position: Side slopes

Shape of areas: Irregular

Size of areas: Up to 74 acres

Composition

Soco soil and similar inclusions: 45 percent

Stecoah soil and similar inclusions: 35 percent

Dissimilar inclusions: 20 percent

Typical Profile

Soco

Surface layer:

0 to 2 inches—very dark grayish brown fine sandy loam

Subsoil:

2 to 33 inches—yellowish brown fine sandy loam

Bedrock:

33 to 80 inches—weathered metasandstone

Stecoah

Surface layer:
0 to 2 inches—very dark grayish brown fine sandy loam

Subsoil:
2 to 47 inches—light yellowish brown sandy loam

Bedrock:
47 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Soco—moderately deep; Stecoah—deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Soco—20 to 40 inches to soft bedrock; Stecoah—40 to 60 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Maymead soils that have bedrock at a depth of more than 60 inches; on benches, on footslopes, and in concave areas at the head of drains
- Northcove soils that have more rock fragments in the subsoil; in drainageways and below rock outcrops
- Cheoah and Jeffrey soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Ditney soils that have less clay in the subsoil and have hard bedrock at a depth of 20 to 40 inches; on spur ridges
- Sylco soils that have more rock fragments in the subsoil and have hard bedrock at a depth of 20 to 40 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Random areas of soils on less than 50 percent or greater than 95 percent slopes
- Random areas where landslides have occurred

Similar inclusions:
- Soco and Stecoah soils that have fine sandy loam, loam, and silt loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Low for hardwoods and high for eastern white pine
Suitability: Poorly suited
Management concerns: Soco—equipment use, erodibility, and windthrow hazard; Stecoah—equipment use and erodibility
Management measures and considerations:
- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, skid trails, and disturbance of the forest floor by heavy machinery.
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited because of the limited rooting depth of the Soco soil.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope and depth to bedrock. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope and depth to bedrock. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7e

StB—Statler loam, 1 to 5 percent slopes, rarely flooded

Setting

Landscape: Mountain valleys of intermountain hills; low and intermediate mountains, dominantly in the southern part of the county along Cane, Hominy, and Newfound Creeks and the French Broad and Swannanoa Rivers
Elevation range: 1,900 to 2,300 feet
Landform: Low stream terraces
Landform position: Concave to planar toeslopes
Shape of areas: Long and narrow
Size of areas: Up to 34 acres

Composition

Statler soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 12 inches—dark brown loam

Subsoil:
12 to 63 inches—strong brown sandy clay loam

Underlying material:
63 to 80 inches—variegated gravelly clay loam that has mottles in shades of red, brown, and gray

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Moderate or high
Depth to seasonal high water table: 4.0 to 6.0 feet from January through December

Hazard of flooding: Rare, throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: High
Potential frost action: Moderate
Soil reaction: Strongly acid to moderately acid in the A horizon, except in limed areas and very strongly acid to slightly acid in the B and C horizons
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Well drained Tate soils on toeslopes
- Soils that have surface layers with less organic matter; in cropped fields
- Somewhat poorly drained French soils that have a subsoil that is loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Poorly drained soils that have a loamy to clayey subsoil; in backwater areas
- Somewhat poorly drained soils that have a loamy subsoil; in backwater areas
- Well drained Rosman soils that have a loamy subsoil; along stream channels
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and are 8 to 40 inches to strata with a high content of rock fragments; along stream channels
- Moderately well drained Dillard soils on low terraces
- Random areas of soils on less than 1 or greater than 5 percent slopes

Similar inclusions:
- Statler soils that have sandy loam, fine sandy loam, and sandy clay loam surface layers

Land Use

Dominant Uses: Cropland
Other Uses: Pasture and hayland

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, climate, tilth, and soil fertility
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving

residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility and soil fertility
Management measures and considerations:
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Suited
Management concerns: Erodibility, wetness, climate, root disease, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and very high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.

- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Flooding, wetness, erodibility, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for dwellings.
- This map unit may be difficult to manage for dwellings due to a seasonal high water table at a depth of 4.0 to 6.0 feet.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wetness, seeps and springs, and restricted permeability
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, seeps and springs, erodibility, and flooding
Management measures and considerations:
- When the soil is wet, unsurfaced roads are highly erodible and very slick due the content of silt and clay in the subsoil.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, wetness, flooding, root disease, soil fertility, soil compaction, and climate
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration. Vegetating disturbed areas and using erosion-control structures, such as sediment fences, help to keep eroding soil on site.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Interpretive Groups

Land capability classification: 2e

SyD—Sylco-Soco complex, 15 to 30 percent slopes, stony

Setting

Landscape: Low and intermediate mountains, dominantly in the southeastern part of the county
Elevation range: 2,200 to 3,800 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow
Size of areas: Up to 44 acres

Composition

Sylco soil and similar inclusions: 50 percent
Soco soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Sylco

Surface layer:
0 to 5 inches—dark yellowish brown channery loam

Subsoil:
5 to 23 inches—strong brown very channery loam

Bedrock:
23 to 80 inches—unweathered hard phyllite

Soco

Surface layer:
0 to 5 inches—very dark grayish brown channery fine sandy loam

Subsoil:
5 to 24 inches—brown fine sandy loam
24 to 35 inches—light yellowish brown channery fine sandy loam

Bedrock:
35 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Sylco—somewhat excessively drained; Soco—well drained
General texture class: Sylco—loamy with many rock fragments; Soco—loamy
Permeability: Moderately rapid

Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe or very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum weathered from low-grade metasedimentary rock
Depth to bedrock: Sylco—20 to 40 inches to hard bedrock; Soco—20 to 40 inches to soft bedrock
Other distinctive properties: High content of rock fragments and water movement along bedrock contacts in the Sylco soil

Minor Components

Dissimilar inclusions:
- Random areas of Stecoah soils that have soft bedrock at a depth of 40 to 60 inches
- Maymead soils that have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in saddles and gaps
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Areas of soils that have hard bedrock at a depth of less than 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop

Similar inclusions:
- Sylco soils that have silt loam surface layers
- Soco soils that have fine sandy loam, loam, and silt loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation and pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Equipment use, erodibility, rooting depth, droughtiness, and soil fertility
Management measures and considerations:
- This map unit is difficult to manage for pasture and hay production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.
- Following lime and fertilizer recommendations from soil tests helps to increase the

availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Low for upland hardwoods
Suitability: Poorly suited
Management concerns: Equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- This map unit is severely limited for timber production because of low productivity and low volume due to the limited rooting depth.
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Extensive blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, slippage, differential settling, and corrosivity
Management measures and considerations:
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of the Sylco soil.
- The soft bedrock underlying the Soco soil should not be difficult to excavate but chunks will be hard to vegetate and pack into a fill slope.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- These soils are subject to uneven settling and may be unstable if not properly compacted.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Sylco—depth to bedrock, slope, and poor filtering capacity; Soco—depth to bedrock and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- This map unit is difficult to manage for septic tank absorption fields due to the moderate depth to bedrock and the high content of rock fragments of the Sylco soil.

Local roads and streets

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, slippage, differential settling, and frost action
Management measures and considerations:
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Extensive blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- These soils are subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, soil fertility, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- The Sylco soil is limited for lawns and landscaping because of the high amount of rock fragments in the root zone.
- Because of the moderately deep rooting depth, these soils are difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- The use of native landscape plants that are tolerant of droughty, acidic soils is recommended.

- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: Sylco—7s; Soco—4e

SyE—Sylco-Soco complex, 30 to 50 percent slopes, stony

Setting

Landscape: Low and intermediate mountains, dominantly in the southeastern part of the county
Elevation range: 2,200 to 3,800 feet
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 87 acres

Composition

Sylco soil and similar inclusions: 45 percent
Soco soil and similar inclusions: 40 percent
Dissimilar inclusions: 15 percent

Typical Profile

Sylco

Surface layer:
0 to 5 inches—dark yellowish brown channery loam

Subsoil:
5 to 23 inches—strong brown very channery loam

Bedrock:
23 to 80 inches—unweathered hard phyllite

Soco

Surface layer:
0 to 5 inches—very dark grayish brown channery fine sandy loam

Subsoil:
5 to 24 inches—brown fine sandy loam
24 to 35 inches—light yellowish brown channery fine sandy loam

Bedrock:
35 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Moderately deep
Drainage class: Sylco—somewhat excessively drained; Soco—well drained
General texture class: Sylco—loamy with many rock fragments; Soco—loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low

Slope class: Steep
Soil slippage potential: Sylco—medium; Soco—low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Sylco—20 to 40 inches to hard bedrock; Soco—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; high content of rock fragments and water movement along bedrock contacts in the Sylco soil

Minor Components

Dissimilar inclusions:
- Random areas of Stecoah soils that have soft bedrock at a depth of 40 to 60 inches
- Northcove soils that have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Maymead soils that have bedrock at a depth of more than 60 inches; on footslopes, on benches, in concave areas at the head of drains, in saddles, and in gaps
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Areas of soils that have hard bedrock at a depth of less than 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop

Similar inclusions:
- Sylco soils that have silt loam surface layers
- Soco soils that have fine sandy loam, loam, and silt loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation and pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Equipment use, erodibility, rooting depth, droughtiness, and soil fertility
Management measures and considerations:
- This map unit is difficult to manage for pasture and hay production because of the

slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Low for upland hardwoods
Suitability: Poorly suited
Management concerns: Equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- This map unit is severely limited for timber production because of low productivity and low volume due to the limited rooting depth of these soils.
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Extensive blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, slippage, differential settling, and corrosivity
Management measures and considerations:
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of the Sylco soil.
- The soft bedrock underlying the Soco soil should not be difficult to excavate but chunks will be hard to vegetate and pack into a fill slope.

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- These soils are subject to uneven settling and may be unstable if not properly compacted.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Sylco—depth to bedrock, slope, and poor filtering capacity; Soco—depth to bedrock and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- This map unit is difficult to manage for septic tank absorption fields due to the moderate depth to bedrock and the high content of rock fragments in the Sylco soil.

Local roads and streets

Suitability: Poorly suited
Management concerns: Depth to bedrock, slope, erodibility, slippage, differential settling, and frost action
Management measures and considerations:
- The underlying bedrock may be susceptible to mass movement. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Extensive blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- These soils are subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, depth to bedrock, soil fertility, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- The Sylco soil is limited for lawns and landscaping because of the high amount of rock fragments in the root zone.

- Because of the moderately deep rooting depth, these soils are difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- The use of native landscape plants that are tolerant of droughty, acidic soils is recommended.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: Sylco—7s; Soco—6e

SzF—Sylco-Soco complex, 50 to 95 percent slopes, very stony

Setting

Landscape: Low and intermediate mountains, dominantly in the southeastern part of the county
Elevation range: 2,200 to 3,800 feet
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 87 acres

Composition

Sylco soil and similar inclusions: 45 percent
Soco soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Sylco

Surface layer:
0 to 5 inches—dark yellowish brown channery loam

Subsoil:
5 to 23 inches—strong brown very channery loam

Bedrock:
23 to 80 inches—unweathered hard phyllite

Soco

Surface layer:
0 to 5 inches—very dark grayish brown channery fine sandy loam

Subsoil:
5 to 24 inches—brown fine sandy loam
24 to 35 inches—light yellowish brown channery fine sandy loam

Bedrock:
35 to 80 inches—weathered metasandstone

Soil Properties and Qualities

Depth class: Moderately deep

Drainage class: Sylco—somewhat excessively drained; Soco—well drained
General texture class: Sylco—loamy with many rock fragments; Soco—loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping to moderately steep
Soil slippage potential: High
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Extremely acid to strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock
Depth to bedrock: Sylco—20 to 40 inches to hard bedrock; Soco—20 to 40 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; a high content of rock fragments and water movement along bedrock contacts in the Sylco soil

Minor Components

Dissimilar inclusions:
- Random areas of Stecoah soils that have soft bedrock at a depth of at 40 to 60 inches
- Northcove soils that have bedrock at a depth of more than 60 inches; in drainageways and below rock outcrops
- Maymead soils that have bedrock at a depth of more than 60 inches; on benches, in concave areas at the head of drains, and in saddles and gaps
- Random areas where landslides have occurred
- Random areas of soils on less than 50 percent or greater than 95 percent slopes
- Areas of soils that have hard bedrock at a depth of less than 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop

Similar inclusions:
- Sylco soils that have silt loam surface layers
- Soco soils that have fine sandy loam, loam, and silt loam surface layers

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, high content of rock fragments, depth to bedrock, and very stony surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, high content of rock fragments, depth to bedrock, and very stony surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, high content of rock fragments, depth to bedrock, and very stony surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, low volume, depth to bedrock, and very stony surface. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, high content of rock fragments, depth to bedrock, and very stony surface. The underlying bedrock is susceptible to mass movement. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope, high content of rock fragments, depth to bedrock, and very stony surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, high content of rock fragments, depth to bedrock, and very stony surface. The underlying bedrock is susceptible to mass movement. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, high content of rock fragments, depth to bedrock, and very stony surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7s

TaB—Tate loam, 2 to 8 percent slopes

Setting

Landscape: Intermountain hills and low or intermediate mountains scattered throughout the county
Elevation range: 2,000 to 3,200 feet
Landform: Coves, colluvial fans, and benches
Landform position: Footslopes and toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 79 acres

Composition

Tate soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 7 inches—brown loam

Subsoil:
7 to 46 inches—brownish yellow clay loam

Underlying material:
46 to 80 inches—brownish yellow cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Unison soils that have more clay in the subsoil
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and on toeslopes
- Somewhat poorly drained French soils that are loamy in the upper part and are 20 to 40 inches to strata with a high of rock fragments; along stream channels
- Soils that are poorly drained; in areas of seeps and springs
- Areas that occasionally flood for very brief duration; along stream channels
- Soils that have surface layers with less organic matter; in cropped fields
- Random areas of moderately eroded soils
- Random areas of soils on less than 2 percent or greater than 8 percent slopes

Similar inclusions:
- Tate soils that have fine sandy loam and sandy clay loam surface layers

Land Use

Dominant Uses: Cropland, pasture, hayland, and ornamental crops
Other Uses: Building site development, recreation, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, tilth, pesticide retention, soil fertility, and climate
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high

content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Well suited
Management concerns: Erodibility, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Well suited
Management concerns: Erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, seeps and springs, slope, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Well suited
Management concerns: Low strength, erodibility, frost action, seeps and springs, and large stones
Management measures and considerations:
- Incorporating sand and gravel into the soil and compacting roadbeds help to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Large stones and boulders may be encountered during excavation.

Lawns and landscaping

Suitability: Well suited
Management concerns: Erodibility, soil compaction, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control

structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: 2e

TaC—Tate loam, 8 to 15 percent slopes

Setting

Landscape: Intermountain hills and low or intermediate mountains scattered throughout the county
Elevation range: 2,000 to 3,200 feet
Landform: Coves, colluvial fans, and benches
Landform position: Footslopes and toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 208 acres

Composition

Tate soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 7 inches—brown loam

Subsoil:
7 to 46 inches—brownish yellow clay loam

Underlying material:
46 to 80 inches—brownish yellow cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy

Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Unison soils that have more clay in the subsoil
- Somewhat poorly drained French soils that are loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions, on toeslopes, and along stream channels
- Soils that are poorly drained; in areas of seeps and springs
- Areas that rarely flood for very brief duration; along stream channels
- Soils that have surface layers with less organic matter; in cropped fields
- Random areas of moderately eroded soils
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Tate soils that have fine sandy loam and sandy clay loam surface layers

Land Use

Dominant Uses: Cropland, pasture, hayland, and ornamental crops
Other Uses: Building site development, recreation, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, equipment use, climate, tilth, pesticide retention, and soil fertility
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.

- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, equipment use, pesticide retention, and soil fertility
Management measures and considerations:
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Well suited
Management concerns: Erodibility, equipment use, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Due to the restricted movement of air and water caused by the clay content of the

subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:
- Designing structures so that they conform to natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, slope, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.

- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, slope, erodibility, frost action, seeps and springs, and large stones
Management measures and considerations:
- Incorporating sand and gravel into the soil and compacting roadbeds helps to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Large stones and boulders may be encountered during excavation.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, soil compaction, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: 3e

TaD—Tate loam, 15 to 30 percent slopes

Setting

Landscape: Intermountain hills and low or intermediate mountains scattered throughout the county
Elevation range: 2,000 to 3,200 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 148 acres

Composition

Tate soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 7 inches—brown loam

Subsoil:
7 to 46 inches—brownish yellow clay loam

Underlying material:
46 to 80 inches—brownish yellow cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Unison soils that have more clay in the subsoil

- Soils that have a seasonal high water table at a depth of less than 6.0 feet; on toeslopes, in depressions, and in drainageways
- Soils that are poorly drained; in areas of seeps and springs
- Areas that rarely flood for very brief duration; along stream channels
- Soils that have surface layers with less organic matter; in cropped fields
- Random areas of moderately eroded to severely eroded soils
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Tate soils that have fine sandy loam and sandy clay loam surface layers

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland, woodland, wildlife habitat, ornamental crops, recreation, and building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, soil fertility, pesticide retention, and climate
Management measures and considerations:
- This soil is difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Suited
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.

- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Suited
Management concerns: Equipment use, erodibility, climate, pesticide retention, soil fertility, and plant shape
Management measures and considerations:
- This soil may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.

- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:

- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, seeps and springs, and restricted permeability
Management measures and considerations:

- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, frost action, large stones, seeps and springs, and low strength
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Large stones and boulders may be encountered during excavation.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, soil compaction, climate, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: 4e

TkC—Tate loam, 8 to 15 percent slopes, very stony

Setting

Landscape: Intermountain hills and low or intermediate mountains scattered throughout the county
Elevation range: 2,400 to 3,500 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Footslopes and toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 33 acres

Composition

Tate soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 7 inches—brown loam

Subsoil:
7 to 46 inches—brownish yellow gravelly sandy clay loam

Underlying material:
46 to 80 inches—brownish yellow cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Unison soils that have surface layers with less organic matter and have more clay in the subsoil
- Toecane soils that have thicker surface layers with more organic matter and more rock fragments in the subsoil; in drainageways
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions, on toeslopes, and along stream channels
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Tate soils that have fine sandy loam and sandy clay loam surface layers

Land Use

Dominant Uses: Pasture, hayland, ornamental crops, cropland
Other Uses: Building site development, recreation, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, pesticide retention, soil fertility, and climate

Management measures and considerations:

- This soil is difficult to manage for cultivated crops because of erodibility, the very stony surface, and the slope, which limits equipment use in the steeper areas.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Well suited to pasture; unsuited to hayland
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:

- The slope and surface stones limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Suited
Management concerns: Equipment use, erodibility, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:

- This map unit is limited for orchard and ornamental crops because of the very stony surface and the slope, which limits equipment use in the steeper areas.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high

content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:
- Designing structures so that they conform to natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, slope, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, slope, erodibility, frost action, seeps and springs, and large stones
Management measures and considerations:
- Incorporating sand and gravel into the soil and compacting roadbeds helps to improve soil strength.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Large stones and boulders may be encountered during excavation.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, soil compaction, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:
- This map unit is limited for lawns and landscaping because of the very stony surface and the slope, which limits equipment use in the steeper areas.
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the

subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: 3s

TkD—Tate loam, 15 to 30 percent slopes, very stony

Setting

Landscape: Intermountain hills and low or intermediate mountains scattered throughout the county
Elevation range: 2,400 to 3,500 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 53 acres

Composition

Tate soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 7 inches—brown loam

Subsoil:
7 to 46 inches—brownish yellow gravelly sandy clay loam

Underlying material:
46 to 80 inches—brownish yellow cobbly loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate

Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Unison soils that have surface layers with less organic matter and have more clay in the subsoil
- Toecane soils that have thicker surface layers with more organic matter and have more rock fragments in the subsoil; in drainageways
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; on toeslopes, in depressions, and in drainageways
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Tate soils that have fine sandy loam and sandy clay loam surface layers

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland, woodland, wildlife habitat, ornamental crops, recreation, and building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, soil fertility, pesticide retention, and climate
Management measures and considerations:
- This soil is difficult to manage for cultivated crops because of erodibility, the very stony surface, and the slope, which limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Suited to pasture; unsuited to hayland
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- The slope and surface stones limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Suited
Management concerns: Equipment use, erodibility, climate, pesticide retention, soil fertility, root disease, and plant shape
Management measures and considerations:
- This map unit is limited for orchard and ornamental crops because of the very stony surface and the slope, which limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Erodibility and equipment use

Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, restricted permeability, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, low strength, frost action, seeps and springs, and large stones

Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Large stones and boulders may be encountered during excavation.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, soil compaction, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: 4s

TmB—Tate-Urban land complex, 2 to 8 percent slopes

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the southern part of the county
Elevation range: 2,000 to 3,200 feet
Landform: Coves, drainageways, and benches
Landform position: Footslopes and toeslopes

Shape of areas: Irregular or oblong
Size of areas: Up to 27 acres

Composition

Tate soil and similar inclusions: 50 percent
Urban land: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Tate

Surface layer:
0 to 6 inches—brown loam

Subsoil:
6 to 22 inches—strong brown clay loam
22 to 49 inches—strong brown sandy clay loam
49 to 56 inches—dark yellowish brown sandy loam

Underlying material:
56 to 81 inches—yellowish brown cobbly sandy loam

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Tate Soil

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches

Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Udorthents, loamy
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas of short, steep slopes
- Random areas of Unison soils that have more clay in the subsoil
- Random areas of Cowee and Evard soils that have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Clifton and similar clayey soils that have soft bedrock at a depth of 40 to 60 inches
- Random areas of somewhat poorly drained French soils that are loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments
- Random areas of soils that have a seasonal high water table at a depth of less than 6.0 feet
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on less than 2 percent or greater than 8 percent slopes

Similar inclusions:
- Tate soils that have fine sandy loam and sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral

Land Use

Dominant Uses: Building site development

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Well suited
Management concerns: Erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, seeps and springs, slope, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Well suited
Management concerns: Erodibility, low strength, frost action, seeps and springs, and large stones
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Large stones and boulders may be encountered during excavation.

Lawns and landscaping

Suitability: Well suited
Management concerns: Slope, erodibility, soil compaction, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- The Tate soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.

- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: Tate—2e; Urban land—8

TmC—Tate-Urban land complex, 8 to 15 percent slopes

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the southern part of the county
Elevation range: 2,000 to 3,200 feet
Landform: Coves, drainageways, and benches
Landform position: Footslopes and toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 63 acres

Composition

Tate soil and similar inclusions: 50 percent
Urban land: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Tate

Surface layer:
0 to 6 inches—brown loam

Subsoil:
6 to 22 inches—strong brown clay loam
22 to 49 inches—strong brown sandy clay loam
49 to 56 inches—dark yellowish brown sandy loam

Underlying material:
56 to 81 inches—yellowish brown cobbly sandy loam

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of

the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Tate Soil

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Udorthents, loamy
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas of short, steep slopes
- Random areas of Unison soils that have more clay in the subsoil
- Random areas of Cowee and Evard soils that have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Clifton and similar clayey soils that have soft bedrock at a depth of 40 to 60 inches
- Random areas of somewhat poorly drained French soils that are loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments
- Random areas of soils that have a seasonal high water table at a depth of less than 6.0 feet
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Tate soils that have fine sandy loam and sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral

Land Use

Dominant Uses: Building site development

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Slope, restricted permeability, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Suited
Management concerns: Slope, erodibility, low strength, frost action, seeps and springs, and large stones
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.

- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Large stones and boulders may be encountered during excavation.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, soil compaction, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- The Tate soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: Tate—3e; Urban land—8

TmD—Tate-Urban land complex, 15 to 30 percent slopes

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the southern part of the county
Elevation range: 2,000 to 3,200 feet
Landform: Coves, drainageways, and benches
Landform position: Footslopes and toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 32 acres

Composition

Tate soil and similar inclusions: 50 percent
Urban land: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Tate

Surface layer:
0 to 6 inches—brown loam

Subsoil:
6 to 22 inches—strong brown clay loam
22 to 49 inches—strong brown sandy clay loam
49 to 56 inches—dark yellowish brown sandy loam

Underlying material:
56 to 81 inches—yellowish brown cobbly sandy loam

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Tate Soil

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Available water capacity: Moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to slightly acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Random areas of Udorthents, loamy
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas of short, steep slopes
- Random areas of Unison soils that have more clay in the subsoil
- Random areas of Cowee and Evard soils that have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Clifton and similar clayey soils that have soft bedrock at a depth of 40 to 60 inches
- Random areas of somewhat poorly drained French soils that are loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments
- Random areas of soils that have a seasonal high water table at a depth of less than 6.0 feet
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Tate soils that have fine sandy loam and sandy clay loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral

Land Use

Dominant Uses: Building site development

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, seeps and springs, corrosivity, and large stones
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.

- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, restricted permeability, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, low strength, frost action, seeps and springs, and large stones
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Large stones and boulders may be encountered during excavation.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, soil compaction, climate, pesticide retention, root disease, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- The Tate soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.

- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: Tate—4e; Urban land—8

TnE—Toecane very cobbly loam, 30 to 50 percent slopes, extremely bouldery

Setting

Landscape: Low and intermediate mountains, dominantly in the western and eastern parts of the county
Elevation range: 2,400 to 4,800 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes and footslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 70 acres

Composition

Toecane soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown cobbly loam

Subsoil:
8 to 24 inches—yellowish brown very cobbly sandy clay loam
24 to 37 inches—dark yellowish brown very cobbly sandy loam

Underlying material:
37 to 80 inches—dark yellowish brown extremely cobbly loamy sand

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Medium
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed

Hazard of water erosion: Very severe
Rock fragments on the surface: About 15 percent surface stones and boulders that average about 10 to 48 inches in diameter and 3 to 10 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Extremely acid to moderately acid throughout the profile
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands; high content of rock fragments; soil slippage potential when soil is saturated

Minor Components

Dissimilar inclusions:
- Areas of rubble land; below rock outcrops and in drainageways
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and drainageways
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways and on the outer edge of map unit delineations
- Random areas of soils on less than 30 percent or greater than 50 percent slopes

Similar inclusions:
- Toecane soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, extremely bouldery surface, and high content of rock fragments. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, extremely bouldery surface, and high content of rock fragments. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, extremely bouldery surface, and high content of rock fragments. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the extremely bouldery surface, high content of rock fragments, and low volume. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, extremely bouldery surface, and high content of rock fragments. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope, extremely bouldery surface, and high content of rock fragments. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, extremely bouldery surface, and high content of rock fragments. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, extremely bouldery surface, and high content of rock fragments.

Interpretive Groups

Land capability classification: 7s

ToC—Toecane-Tusquitee complex, 8 to 15 percent slopes, bouldery

Setting

Landscape: Low and intermediate mountains, dominantly in the western and eastern parts of the county
Elevation range: 2,400 to 4,400 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Footslopes and toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 93 acres

Composition

Toecane soil and similar inclusions: 50 percent

Tusquitee soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Toecane

Surface layer:
0 to 8 inches—very dark grayish brown cobbly loam

Subsoil:
8 to 24 inches—yellowish brown very cobbly sandy clay loam
24 to 37 inches—dark yellowish brown very cobbly sandy loam

Underlying material:
37 to 80 inches—dark yellowish brown extremely cobbly loamy sand

Tusquitee

Surface layer:
0 to 9 inches—very dark grayish brown gravelly loam

Subsoil:
9 to 71 inches—dark yellowish brown sandy loam

Underlying material:
71 to 101 inches—dark yellowish brown cobbly sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Toecane—loamy with many rock fragments; Tusquitee—loamy
Permeability: Moderately rapid
Available water capacity: Toecane—low; Tusquitee—moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Toecane—low; Tusquitee—moderate
Special climatic conditions: Soils subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Toecane—extremely acid to moderately acid throughout the profile; Tusquitee—very strongly acid to slightly acid in the A horizon and very strongly acid to moderately acid in the B and C horizons
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; high content of rock fragments in the Toecane soil

Minor Components

Dissimilar inclusions:
- Areas of rubble land; in drainageways
- Areas of Toecane soils where the surface fragments have been removed
- Random areas of Tate soils that have more clay in the subsoil
- Random areas of soils that have surface layers with less organic matter
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and drainageways
- Areas that rarely flood for very brief duration; along stream channels
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways and on the outer edge of map unit delineations
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Toecane and Tusquitee soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, building site development, and pasture

Agricultural Development

Cropland

Suitability: Toecane—unsuited; Tusquitee—suited
Management concerns: Equipment use, erodibility, soil fertility, pesticide retention, and climate
Management measures and considerations:
- This map unit is severely limited for crop production because of the bouldery surface and the high content of rock fragments in the Toecane soil.
- The slope may limit the use of equipment in the steeper areas.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Suited to pasture; unsuited to hayland
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- The slope and surface stones and boulders limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.

• Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
• These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
• Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
• Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
• Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Toecane—unsuited; Tusquitee—suited
Management concerns: Equipment use, ball and burlap harvesting, erodibility, climate, pesticide retention, and soil fertility
Management measures and considerations:
• This map unit is severely limited for orchard and ornamental crops because of the bouldery surface and the high content of rock fragments in the Toecane soil.
• The slope may limit the use of equipment in the steeper areas.
• Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
• Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
• These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
• Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
• In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
• Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Equipment use and erodibility
Management measures and considerations:
• Using cable logging methods helps to overcome limited road and trail construction caused by the large number of stones and boulders on the soil surface.
• Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
• Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
• Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
• When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due the high content of organic matter in the surface layer.

- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Toecane—poorly suited; Tusquitee—suited
Management concerns: Toecane—large stones, slope, erodibility, seeps and springs, corrosivity, and cutbanks cave; Tusquitee—large stones, slope, erodibility, seeps and springs, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Large stones and boulders will be encountered during excavation.
- Designing structures so that they conform to natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Toecane—unsuited; Tusquitee—suited
Management concerns: Toecane—large stones, slope, seeps and springs, and poor filtering capacity; Tusquitee—large stones, slope, and seeps and springs
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Large stones and boulders will be encountered during excavation.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Toecane soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Poorly suited
Management concerns: Toecane—large stones, slope, erodibility, seeps and springs, and differential settling; Tusquitee—large stones, slope, erodibility, seeps and springs, and frost action
Management measures and considerations:
- Large stones and boulders will be encountered during excavation.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- The Toecane soil is subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Toecane—poorly suited; Tusquitee—suited
Management concerns: Large stones, slope, erodibility, climate, pesticide retention, and soil fertility
Management measures and considerations:
- This map unit is limited for lawns and landscaping because of the bouldery surface and the high content of rock fragments in the Toecane soil.
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: Toecane—6s; Tusquitee—3s

TpD—Toecane-Tusquitee complex, 15 to 30 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains, dominantly in the western and eastern parts of the county
Elevation range: 2,400 to 4,800 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 443 acres

Composition

Toecane soil and similar inclusions: 45 percent
Tusquitee soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Toecane

Surface layer:
0 to 8 inches—very dark grayish brown cobbly loam

Subsoil:
8 to 24 inches—yellowish brown very cobbly sandy clay loam
24 to 37 inches—dark yellowish brown very cobbly sandy loam

Underlying material:
37 to 80 inches—dark yellowish brown extremely cobbly loamy sand

Tusquitee

Surface layer:
0 to 9 inches—very dark grayish brown gravelly loam

Subsoil:
9 to 71 inches—dark yellowish brown sandy loam

Underlying material:
71 to 101 inches—dark yellowish brown cobbly sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Toecane—loamy with many rock fragments; Tusquitee—loamy
Permeability: Moderately rapid
Available water capacity: Toecane—low; Tusquitee—moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart (fig. 15)
Organic matter content of surface layer: High or very high
Potential frost action: Toecane—low; Tusquitee—moderate
Special climatic conditions: Soils subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Toecane—extremely acid to moderately acid throughout the profile; Tusquitee—very strongly acid to slightly acid in the A horizon and very strongly acid to moderately acid in the B and C horizons
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; high content of rock fragments in the Toecane soil

Minor Components

Dissimilar inclusions:
- Areas of rubble land; in drainageways

Figure 15.—Boulders are a major management concern for any use in areas of Toecane-Tusquitee complex, 15 to 30 percent slopes, very bouldery.

- Areas of Toecane soils where the surface fragments have been removed
- Random areas of Tate soils that have more clay in the subsoil
- Random areas of soils that have surface layers with less organic matter
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and drainageways
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways and on the outer edge of map unit delineations
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Toecane and Tusquitee soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, building site development, and pasture

Agricultural Development

Cropland

Suitability: Toecane—unsuited; Tusquitee—poorly suited
Management concerns: Equipment use, erodibility, soil fertility, pesticide retention, and climate
Management measures and considerations:
- This map unit is severely limited for crop production because of the slope, erodibility, the very bouldery surface, and the high content of rock fragments in the Toecane soil.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- The slope and surface stones and boulders limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Toecane—unsuited; Tusquitee—suited
Management concerns: Equipment use, ball and burlap harvesting, erodibility, climate, pesticide retention, and soil fertility
Management measures and considerations:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, very bouldery surface, and the high content of rock fragments in the Toecane soil.

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Equipment use, erodibility, and pesticide retention
Management measures and considerations:
- Using cable logging methods helps to overcome limited road and trail construction caused by the large number of stones and boulders on the soil surface.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Toecane—poorly suited; Tusquitee—suited
Management concerns: Toecane—slope, large stones, erodibility, seeps and springs, corrosivity, and cutbanks cave; Tusquitee—slope, large stones, erodibility, seeps and springs, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing structures so that they conform to natural slopes helps to improve soil performance.
- Large stones and boulders will be encountered during excavation.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Toecane—unsuited; Tusquitee—suited
Management concerns: Toecane—slope, large stones, seeps and springs, and poor filtering capacity; Tusquitee—slope, large stones, and seeps and springs
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Large stones and boulders will be encountered during excavation.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Toecane soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Poorly suited
Management concerns: Toecane—slope, erodibility, large stones, seeps and springs, and differential settling; Tusquitee—slope, erodibility, large stones, seeps and springs, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Large stones and boulders will be encountered during excavation.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- The Toecane soil is subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, large stones, climate, pesticide retention, and soil fertility
Management measures and considerations:
- This map unit is limited for lawns and landscaping because of the slope, the very bouldery surface, and the high content of rock fragments in the Toecane soil.
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high

content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: Toecane—6s; Tusquitee—4s

TpE—Toecane-Tusquitee complex, 30 to 50 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains, dominantly in the western and eastern parts of the county
Elevation range: 2,400 to 4,800 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes and footslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 389 acres

Composition

Toecane soil and similar inclusions: 50 percent
Tusquitee soil and similar inclusions: 35 percent
Dissimilar inclusions: 15 percent

Typical Profile

Toecane

Surface layer:
0 to 8 inches—very dark grayish brown cobbly loam

Subsoil:
8 to 24 inches—yellowish brown very cobbly sandy clay loam
24 to 37 inches—dark yellowish brown very cobbly sandy loam

Underlying material:
37 to 80 inches—dark yellowish brown extremely cobbly loamy sand

Tusquitee

Surface layer:
0 to 9 inches—very dark grayish brown gravelly loam

Subsoil:
9 to 71 inches—dark yellowish brown sandy loam

Underlying material:
71 to 101 inches—dark yellowish brown cobbly sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Toecane—loamy with many rock fragments; Tusquitee—loamy
Permeability: Moderately rapid
Available water capacity: Toecane—low; Tusquitee—moderate
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Toecane—medium; Tusquitee—low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Toecane—low; Tusquitee—moderate
Special climatic conditions: Soils subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Toecane—extremely acid to moderately acid throughout the profile; Tusquitee—very strongly acid to slightly acid in the A horizon and very strongly acid to moderately acid in the B and C horizons
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; high content of rock fragments in the Toecane soil; soil slippage potential when soils are saturated

Minor Components

Dissimilar inclusions:
- Areas of rubble land; below rock outcrops and in drainageways
- Random areas of Tate soils that have more clay in the subsoil
- Random areas of soils that have surface layers with less organic matter
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; in depressions and drainageways
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways and on the outer edge of map unit delineations
- Random areas of soils on less than 30 percent or greater than 50 percent slopes

Similar inclusions:
- Toecane and Tusquitee soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Woodland and wildlife habitat
Other Uses: Recreation, building site development, and pasture

Agricultural Development

Cropland

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- The slope and surface stones and boulders limit the use of equipment and may be hazardous.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, very bouldery surface, and the high content of rock fragments in the Toecane soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Equipment use and erodibility
Management measures and considerations:
- Using cable logging methods helps to overcome limited road and trail construction caused by the large number of stones and boulders on the soil surface.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Toecane—unsuited; Tusquitee—poorly suited
Management concerns: Toecane—slope, large stones, erodibility, seeps and springs, corrosivity, and cutbanks cave; Tusquitee—slope, large stones, erodibility, seeps and springs, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Large stones and boulders will be encountered during excavation.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Toecane—unsuited; Tusquitee—poorly suited
Management concerns: Toecane—large stones, slope, seeps and springs, and poor filtering capacity; Tusquitee—large stones, slope, and seeps and springs
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Large stones and boulders will be encountered during excavation.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Toecane soil readily absorbs but does not adequately filter effluent.

Local roads and streets

Suitability: Poorly suited
Management concerns: Toecane—slope, erodibility, large stones, seeps and springs, and differential settling; Tusquitee—slope, erodibility, large stones, seeps and springs, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Large stones and boulders will be encountered during excavation.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- The Toecane soil is subject to uneven settling and may be unstable if not properly compacted.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, large stones, climate, pesticide retention, and soil fertility
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the slope, the very bouldery surface, and the high content of rock fragments in the Toecane soil.
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: 7s

TsA—Toxaway loam, 0 to 2 percent slopes, frequently flooded

Setting

Landscape: Mountains valleys of intermountain hills; low and intermediate mountains, dominantly along Cane, Hominy, Reems, and Newfound Creeks and the French Broad and Swannanoa Rivers
Elevation range: 1,800 to 2,100 feet
Landform: Flood plains
Landform position: Planar to slightly concave bottomland slopes
Shape of areas: Long and narrow
Size of areas: Up to 18 acres

Composition

Toxaway soil and similar inclusions: 90 percent
Dissimilar inclusions: 10 percent

Typical Profile

Surface layer:
0 to 36 inches—very dark gray loam

Underlying material:
36 to 43 inches—very dark gray sandy loam

43 to 53 inches—grayish brown sand
53 to 65 inches—gray sandy clay loam
65 to 82 inches—gray loamy sand

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Very poorly drained
General texture class: Loamy from 40 to more than 60 inches over deposits of gravel and cobbles that are stratified with sandy and loamy material
Permeability: Moderate
Available water capacity: Low
Depth to seasonal high water table: 1.0 foot or less from December through May and 0.5 foot to 1.5 feet from June through November
Hazard of flooding: Occasional, throughout the year with standing water for less than 2 days
Shrink-swell potential: Low or none
Slope class: Nearly level
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: None or slight
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Strongly acid to slightly acid throughout the profile, except where surface layers have been limed
Parent material: Recent loamy alluvium that is derived from material weathered from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Depth to contrasting material: 40 to more than 60 inches to deposits of cobbles and gravels that are stratified with sandy or loamy material
Other distinctive properties: Soil subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:
- Iotla soils that are somewhat poorly drained; in depressions, old stream channels, and backwater areas
- Moderately well drained Rosman soils that have strata with a high content of rock fragments at a depth of more than 40 inches; in the slightly higher-lying positions
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and are 8 to 40 inches to strata with a high content of rock fragments; along stream channels
- Nikwasi and Ela soils that are poorly drained; in depressions, old stream channels, and backwater areas
- Moderately well drained Dillard soils that have more clay in the subsoil; on low stream terraces and toeslopes
- Random areas of scouring and deposition during flooding
- Well drained Statler soils on low terraces
- Biltmore soils that are well drained soils, are sandy, and have strata with a high content of rock fragments at a depth of more than 40 inches; in the slightly higher-lying positions

- Random areas of soils greater than 2 percent slopes
- Soils that have bedrock at a depth of less than 6.0 feet; in drainageways

Similar inclusions:
- Toxaway soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Ornamental crops, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the wetness and flooding. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Flooding, wetness, pesticide retention, soil fertility, nutrient leaching, and erodibility
Management measures and considerations:
- While most flooding occurs during the winter months, there is a risk of crop loss during the growing season.
- Maintaining existing drainageways and ditches helps to remove excess water from a seasonal high water table.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using split applications of lime and fertilizer helps to increase their effectiveness and helps to avoid the leaching of plant nutrients below the rooting zone and into the water table.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the wetness and flooding. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited

Management concerns:
- This map unit is severely limited for timber production because of the wetness and flooding. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the flooding and wetness. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the wetness, poor filtering capacity, and flooding. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the flooding and wetness. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the wetness and flooding. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 4w

TtE—Trimont loam, 30 to 50 percent slopes, stony

Setting

Landscape: Low or intermediate mountains scattered throughout the county
Elevation range: 2,500 to 3,200 feet
Landform: North- to east-facing hillslopes and mountain slopes and those shaded by the higher mountains
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 39 acres

Composition

Trimont soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 7 inches—dark grayish brown loam
7 to 10 inches—dark yellowish brown gravelly loam

Subsoil:
10 to 28 inches—reddish brown sandy clay loam
28 to 43 inches—yellowish red clay loam
43 to 61 inches—reddish brown loam

Underlying material:
61 to 81 inches—brown sandy loam saprolite

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Moderate or high
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to cooler annual air temperatures, which allow late spring and early frosts; higher soil moisture content due to north- to east-facing aspects and shading by the higher mountains
Soil reaction: Very strongly acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Potential for downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of Clifton soils that have a clayey subsoil and have bedrock at a depth of more than 60 inches
- Evard soils and soils with a browner subsoil that have thinner surface layers with less organic matter; on south- to west-facing side slopes and spur ridges
- Cowee soils and soils with a browner subsoil that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to 40 inches; on south- to west-facing side slopes and spur ridges
- Random areas of soils that have more mica in the subsoil and have bedrock at a depth of 20 to more than 60 inches
- Tate and Tusquitee soils in concave areas at the head of drains and on footslopes
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Soils which have high base saturation in the lower subsoil; dominantly in the south-central and southeastern parts of the county
- Widely scattered areas of rock outcrop

Similar inclusions:
- Evard and Cowee soils that have sandy loam and fine sandy loam surface layers
- Random areas of similar soils that have a brown subsoil
- Random areas of similar soils that have soft bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Woodland, wildlife habitat, and pasture
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope and erodibility. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.
- Growing adapted plants helps to ensure the production of high-quality forage and minimize soil erosion.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using pesticides that are applied to the plant rather than the soil may increase their effectiveness.
- Applying lime and fertilizer according to recommendations based on soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, pesticide retention, ball and burlap harvesting, plant shape, climate, and soil fertility
Management measures and considerations:
- This soil may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Applying lime and fertilizer according to recommendations based on soil tests helps to increase the availability of plant nutrients and maximize productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using pesticides that are applied to the plant rather than the soil may increase their effectiveness.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of the roots.

- Because of the cooler air temperatures associated with the north- to east-facing aspects of this map unit, late spring frost may damage new growth in some years.
- The slope affects the shape of ornamentals on the uphill side.
- Because of the restricted movement of air and water caused by the clay content of the subsoil, there is a potential for phytophthora root disease. As a result, this map unit is limited for the production of Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderate for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Equipment use and erodibility
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, and corrosivity
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete and uncoated steel.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and restricted permeability
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erodibility, and frost action
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, soil fertility, climate, pesticide retention, and soil compaction
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Due to the restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- The use of native, winter-hardy landscape plants is recommended.
- Because of the cooler air temperatures associated with the north- and east-facing aspects of this map unit, late spring frost may damage new growth in some years.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants. Using pesticides that are applied to the plant rather than the soil may increase their effectiveness.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: 6e

TuD—Tusquitee-Toecane complex, 15 to 30 percent slopes, stony

Setting

Landscape: Low or intermediate mountains in the western and eastern parts of the county
Elevation range: 2,400 to 3,600 feet

Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 20 acres

Composition

Tusquitee soil and similar inclusions: 60 percent
Toecane soil and similar inclusions: 30 percent
Dissimilar inclusions: 10 percent

Typical Profile

Tusquitee

Surface layer:
0 to 9 inches—very dark grayish brown gravelly loam

Subsoil:
9 to 71 inches—dark yellowish brown sandy loam

Underlying material:
71 to 101 inches—dark yellowish brown cobbly sandy loam

Toecane

Surface layer:
0 to 8 inches—very dark grayish brown cobbly loam

Subsoil:
8 to 24 inches—yellowish brown very cobbly sandy clay loam
24 to 37 inches—dark yellowish brown very cobbly sandy loam

Underlying material:
37 to 80 inches—dark yellowish brown extremely cobbly loamy sand

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Tusquitee—loamy; Toecane—loamy with many rock fragments
Permeability: Moderately rapid
Available water capacity: Tusquitee—moderate; Toecane—low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Tusquitee—moderate; Toecane—low
Special climatic conditions: Soils subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Tusquitee—very strongly acid to slightly acid in the A horizon and very strongly acid to moderately acid in the B and C horizons; Toecane—extremely acid to moderately acid throughout the profile

Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands; high content of rock fragments in the Toecane soil

Minor Components

Dissimilar inclusions:
- Random areas of Tate soils that have more clay in the subsoil
- Random areas of soils that have surface layers with less organic matter
- Areas of very bouldery to extremely bouldery soils or rubble land; in drainageways
- Soils that have a seasonal high water table at a depth of less than 6.0 feet; on toeslopes, in depressions, and in drainageways
- Soils that have bedrock at a depth of less than 6.0 feet; on the outer edge of map unit delineations
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of moderately eroded to severely eroded soils
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Tusquitee and Toecane soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Pasture and hayland
Other Uses: Cropland, woodland, wildlife habitat, ornamental crops, recreation, and building site development

Agricultural Development

Cropland

Suitability: Tusquitee—suited; Toecane—unsuited
Management concerns: Equipment use, erodibility, tilth, soil fertility, pesticide retention, and climate
Management measures and considerations:
- These soils are difficult to manage for cultivated crops because of the slope, which limits equipment use, and the high content of rock fragments in the Toecane soil.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Suited

Management concerns: Equipment use, erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- The Toecane soil is limited because of the high amount of rock fragments in the root zone.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Tusquitee—suited; Toecane—unsuited
Management concerns: Tusquitee—equipment use, erodibility, climate, pesticide retention, soil fertility, and plant shape; Toecane—equipment use, erodibility, climate, pesticide retention, soil fertility, plant shape, and ball and burlap harvesting
Management measures and considerations:
- These soils may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- The Toecane soil is severely limited for ball and burlap harvesting because of the high amount of rock fragments in the root zone.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- The slope affects the shape of ornamentals on the uphill side.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and northern hardwoods
Suitability: Suited
Management concerns: Erodibility and equipment use

Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Tusquitee—suited; Toecane—poorly suited
Management concerns: Tusquitee—slope, erodibility, seeps and springs, large stones, and corrosivity; Toecane—slope, erodibility, seeps and springs, large stones, corrosivity, and cutbanks cave
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Large stones and boulders may be encountered during excavation.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing permanent retaining walls helps to improve soil stability.

Septic tank absorption fields

Suitability: Tusquitee—suited; Toecane—poorly suited
Management concerns: Tusquitee—slope and seeps and springs; Toecane—slope, seeps and springs, and poor filtering capacity
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Measures that improve the filtering capacity should be considered; the Toecane soil readily absorbs but does not adequately filter effluent.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Poorly suited

Management concerns: Tusquitee—slope, erodibility, seeps and springs, large stones, and frost action; Toecane—slope, erodibility, seeps and springs, large stones, and differential settling

Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Large stones and boulders will be encountered during excavation.
- The Toecane soil is subject to uneven settling and may be unstable if not properly compacted.

Lawns and landscaping

Suitability: Tusquitee—suited; Toecane—poorly suited

Management concerns: Tusquitee—slope, erodibility, soil compaction, climate, pesticide retention, and soil fertility; Toecane—slope, erodibility, soil compaction, climate, pesticide retention, soil fertility, and large stones

Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- The Toecane soil is severely limited for lawns and landscaping because of the high amount of rock fragments in the root zone.

Interpretive Groups

Land capability classification: Tusquitee—4e; Toecane—7s

TwB—Tusquitee-Whiteside complex, 2 to 8 percent slopes

Setting

Landscape: Mountain valleys of the intermountain hills; low or intermediate mountains in the western and eastern parts of the county

Elevation range: 2,400 to 3,600 feet
Landform: Coves, colluvial fans, and benches
Landform position: Concave to planar toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 34 acres

Composition

Tusquitee soil and similar inclusions: 55 percent
Whiteside soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Tusquitee

Surface layer:
0 to 9 inches—very dark grayish brown gravelly loam

Subsoil:
9 to 71 inches—dark yellowish brown sandy loam

Underlying material:
71 to 101 inches—dark yellowish brown cobbly sandy loam

Whiteside

Surface layer:
0 to 11 inches—very dark grayish brown loam

Subsoil:
11 to 37 inches—yellowish brown loam that has mottles in shades of red and brown

Underlying material:
37 to 80 inches—light brownish gray fine sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Tusquitee—well drained; Whiteside—moderately well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Tusquitee—moderate; Whiteside—moderate or high
Depth to seasonal high water table: Tusquitee—more than 6.0 feet; Whiteside—2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Soil reaction: Tusquitee—very strongly acid to moderately acid throughout the profile; Whiteside—very strongly acid to neutral in the A horizon and very strongly acid to moderately acid in the B and C horizons
Parent material: Tusquitee—colluvium; Whiteside—colluvium and old alluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches

Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and are 8 to 40 inches to strata with a high content of rock fragments; along stream channels
- Somewhat poorly drained French soils that have a subsoil that is loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Soils that have surface layers with less organic matter; in cropped fields
- Very poorly drained Hemphill soils that have a clayey subsoil; in depressions and backwater areas
- Areas that occasionally flood for very brief duration; along stream channels
- Random areas of soils on less than 2 percent or greater than 8 percent slopes

Similar inclusions:
- Tusquitee soils that have sandy loam and fine sandy loam surface layers
- Whiteside soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Hayland, pasture, and cropland
Other Uses: Recreation, wildlife habitat, and building site development

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, climate, tilth, pesticide retention, and soil fertility
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.

- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Tusquitee—well suited; Whiteside—poorly suited
Management concerns: Tusquitee—erodibility, climate, root disease, seeps and springs, and soil fertility; Whiteside—erodibility, climate, root disease, seeps and springs, soil fertility, and wetness
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content in the subsoil of the Whiteside soil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and very high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content in the subsoil of the Whiteside soil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.

- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Tusquitee—suited; Whiteside—poorly suited
Management concerns: Tusquitee—erodibility, seeps and springs, corrosivity, and large stones; Whiteside—erodibility, seeps and springs, corrosivity, large stones, and wetness
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for dwellings.
- This map unit is difficult to manage for dwellings due to a seasonal high water table at a depth of 2.0 to 3.0 feet in areas of the Whiteside soil.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Tusquitee—suited; Whiteside—poorly suited
Management concerns: Tusquitee—seeps and springs, large stones, and wetness; Whiteside—seeps and springs, large stones, wetness, and restricted permeability
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for septic tank absorption fields.
- This map unit is difficult to manage for septic tank absorption fields due to a seasonal high water table at a depth of 2.0 to 3.0 feet in areas of the Whiteside soil.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Tusquitee—suited; Whiteside—poorly suited
Management concerns: Tusquitee—erodibility, seeps and springs, large stones, and wetness; Whiteside—erodibility, seeps and springs, large stones, wetness, and low strength
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- When the soil is wet, unsurfaced roads are highly erodible and very slick due the content of silt and clay in the subsoil of the Whiteside soil.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Large stones and boulders may be encountered during excavation.

Lawns and landscaping

Suitability: Suited
Management concerns: Tusquitee—erodibility, climate, root disease, soil fertility, and

wetness; Whiteside—erodibility, climate, root disease, soil fertility, wetness, and soil compaction

Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating disturbed areas and using erosion-control structures, such as sediment fences, help to keep eroding soil on site.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content in the subsoil of the Whiteside soil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.

Interpretive Groups

Land capability classification: Tusquitee—2e; Whiteside—2w

TwC—Tusquitee-Whiteside complex, 8 to 15 percent slopes

Setting

Landscape: Mountain valleys of the intermountain hills; low or intermediate mountains in the western and eastern parts of the county
Elevation range: 2,400 to 3,600 feet
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Concave to planar footslopes and toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 65 acres

Composition

Tusquitee soil and similar inclusions: 55 percent
Whiteside soil and similar inclusions: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Tusquitee

Surface layer:
0 to 9 inches—very dark grayish brown gravelly loam

Subsoil:
9 to 71 inches—dark yellowish brown sandy loam

Underlying material:
71 to 101 inches—dark yellowish brown cobbly sandy loam

Whiteside

Surface layer:
0 to 11 inches—very dark grayish brown loam

Subsoil:
11 to 37 inches—yellowish brown loam that has mottles in shades of red and brown

Underlying material:
37 to 80 inches—light brownish gray fine sandy loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Tusquitee—well drained; Whiteside—moderately well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Tusquitee—moderate; Whiteside—moderate or high
Depth to seasonal high water table: Tusquitee—more than 6.0 feet; Whiteside—2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Soil reaction: Tusquitee—very strongly acid to moderately acid throughout the profile; Whiteside—very strongly acid to neutral in the A horizon and very strongly acid to moderately acid in the B and C horizons
Parent material: Tusquitee—colluvium; Whiteside—colluvium and old alluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soils subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and 8 to 40 inches to strata with a high content of rock fragments; along stream channels
- Somewhat poorly drained French soils that have subsoils that are loamy in the upper part and that are 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Soils that have surface layers with less organic matter; in cropped fields
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Tusquitee soils that have sandy loam and fine sandy loam surface layers
- Whiteside soils that have sandy loam and fine sandy loam surface layers

Land Use

Dominant Uses: Hayland, pasture, and cropland
Other Uses: Recreation, wildlife habitat, and building site development

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, equipment use, climate, tilth, pesticide retention, and soil fertility
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, equipment use, pesticide retention, and soil fertility
Management measures and considerations:
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Tusquitee—well suited; Whiteside—poorly suited
Management concerns: Tusquitee—erodibility, equipment use, climate, root disease,

Figure 16.—Pure stands of even-aged yellow-poplar occur when pastureland is abandoned on Tusquitee and Whiteside soils.

seeps and springs, and soil fertility; Whiteside—erodibility, equipment use, climate, root disease, seeps and springs, soil fertility, and wetness

Management measures and considerations:

- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content in the subsoil of the Whiteside soil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and very high for eastern white pine

Suitability: Well suited (fig. 16)

Management concerns: Erodibility and equipment use

Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.

- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content in the subsoil of the Whiteside soil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Tusquitee—suited; Whiteside—poorly suited
Management concerns: Tusquitee—slope, erodibility, seeps and springs, corrosivity, and large stones; Whiteside—slope, erodibility, seeps and springs, corrosivity, large stones, and wetness
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for dwellings.
- This map unit is difficult to manage for dwellings due to a seasonal high water table at a depth of 2.0 to 3.0 feet in areas of the Whiteside soil.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Tusquitee—suited; Whiteside—poorly suited
Management concerns: Tusquitee—slope, seeps and springs, and large stones; Whiteside—slope, seeps and springs, large stones, wetness, and restricted permeability
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for septic tank absorption fields.
- This map unit is difficult to manage for septic tank absorption fields due to a seasonal high water table at a depth of 2.0 to 3.0 feet in areas of the Whiteside soil.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Tusquitee—suited; Whiteside—poorly suited
Management concerns: Tusquitee—erodibility, seeps and springs, and wetness; Whiteside—erodibility, seeps and springs, wetness, and low strength
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

- When the soil is wet, unsurfaced roads are highly erodible and very slick due the content of silt and clay in the subsoil of the Whiteside soil.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.

Lawns and landscaping

Suitability: Suited
Management concerns: Tusquitee—slope, erodibility, climate, pesticide retention, root disease, soil fertility, and wetness; Whiteside—slope, erodibility, climate, pesticide retention, root disease, soil fertility, wetness, and soil compaction
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating disturbed areas and using erosion-control structures, such as sediment fences, help to keep eroding soil on site.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content in the subsoil of the Whiteside soil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.

Interpretive Groups

Land capability classification: 3e

UcB—Udifluvents, sandy, 0 to 5 percent slopes, frequently flooded

Setting

Landscape: Mountain valleys, dominantly along the French Broad River
Elevation range: 1,800 to 2,100 feet
Landform: Flood plains, including river islands
Landform position: Planar to slightly convex bottomland slopes
Shape of areas: Irregular
Size of areas: Up to 8 acres

Composition

Udifluvents, sandy, and similar inclusions: 90 percent
Dissimilar inclusions: 10 percent

Typical Profile

This map unit consists of very low-lying, riverwash areas that are subject to scouring and deposition during flooding. Areas include small islands and the inside of river bends of the French Broad River. A typical profile is not given due to the variable nature of the soil.

Soil Properties and Qualities

Note: Properties are variable and dependent on the extent of disturbance by flooding.

Depth class: Very deep
Drainage class: Excessively drained
General texture class: Sandy with many rock fragments
Permeability: Very rapid
Available water capacity: Very low
Depth to seasonal high water table: 3.5 to 5 feet from January through December
Hazard of flooding: Frequent, throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: None
Extent of erosion: None to moderate
Hazard of water erosion: Very severe
Organic matter content of surface layer: Very low
Potential frost action: Low
Soil reaction: Strongly acid to slightly alkaline throughout the profile
Parent material: Recent alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Soils subject to scouring and deposition during flooding

Minor Components

Dissimilar inclusions:
- Random areas of moderately well drained Dellwood and Reddies soils that are loamy in the upper part and are 8 to 40 inches to strata with a high content of rock fragments
- Well drained Biltmore soils that have a sandy subsoil; in the higher-lying areas
- Random areas of soils that have bedrock at a depth of less than 60 inches
- Moderately well drained French soils that have a subsoil that is loamy in the upper part and have sandy strata with a high content of rock fragments at a depth of 20 to 40 inches; in depressions
- Moderately well drained to poorly drained soils that have a loamy to sandy subsoil on low stream terraces, in depressions, and in backwater areas
- Areas of soils on greater than 5 percent slopes; along stream channels

Similar inclusions:
- Soils that are similar to Udifluvents but that have loamy or clayey underlying material

Land Use

Dominant Uses: Wildlife habitat
Other Uses: Recreation

Agricultural Development

Cropland

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for crop production because of the frequent flooding. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the frequent flooding. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the frequent flooding. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the frequent flooding and very low woodland productivity. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the frequent flooding. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the frequent flooding and poor filtering capacity. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the frequent flooding. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the frequent flooding. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7w

Ud—Udorthents, loamy

Setting

Landscape: Intermountain hills and low or intermediate mountains, dominantly in the central and southern parts of the county
Elevation range: 1,900 to 3,800 feet
Landform: Ridges, hillslopes, mountain slopes, coves, stream terraces, and flood plains
Landform position: Summits, side slopes, footslopes, toeslopes, and bottomland
Shape of areas: Irregular
Size of areas: Up to 319 acres

Composition

Udorthents, loamy, and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

This map unit consists of cut and fill areas where soil and the underlying material have been removed and placed on an adjacent site. Areas include highway right-of-way corridors and building sites. Other areas included in the map unit are landfills and borrow pits. A typical profile is not given due to the variable nature of the soil.

Soil Properties and Qualities

Note: Properties are variable and dependent on the type of fill material used or the type of rock exposed at the surface.

Depth class: Deep or very deep
Drainage class: Somewhat excessively drained to moderately well drained
General texture class: Loamy
Permeability: Very rapid to slow
Available water capacity: Low or moderate
Depth to seasonal high water table: Variable; occasionally 3 to 6 feet and more commonly more than 6 feet from January through December
Hazard of flooding: Variable, commonly none or rare throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level to moderately steep; sides can be very steep to nearly vertical
Soil slippage potential: Medium
Extent of erosion: Slight to severe
Hazard of water erosion: Moderate to very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that are about 3 to 24 inches in diameter and more than 100 feet apart
Organic matter content of surface layer: Low
Potential frost action: Low
Soil reaction: Very strongly acid to slightly alkaline throughout the profile
Parent material: Loamy fill material
Depth to bedrock: Excavated areas—bedrock commonly exposed at or near the soil surface; fill areas—40 to more than 60 inches
Other distinctive properties: Soils subject to downslope movement when lateral support is removed; soils subject to differential settling

Minor Components

Dissimilar inclusions:
- Urban land
- Areas that contain asphalt, wood, glass, and other waste material
- Areas of undisturbed soils around the edge of the map units
- Areas that have bedrock at a depth of less than 40 inches
- Areas that have stones and boulders on the soil surface
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas that are somewhat poorly drained or poorly drained
- Random areas of short, steep to nearly vertical slopes

Similar inclusions:
- Soils that are similar to Udorthents but that have sandy or clayey underlying material

Land Use

Dominant Uses: Highway right-of-way corridors
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the highly variable soil properties. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Highly disturbed soils
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the highly variable soil properties. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Undetermined
Suitability: Poorly suited
Management concerns: Highly disturbed soils
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Planting the appropriate species, as recommended by a forester, helps to achieve maximum productivity and helps to ensure planting success.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Erodibility and highly disturbed soils
Management measures and considerations:
- This map unit is severely limited for dwellings and small commercial buildings because of the highly variable soil properties.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the highly variable soil properties. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Poorly suited
Management concerns: Erodibility and highly disturbed soils
Management measures and considerations:
- This map unit is severely limited for roads and streets because of the highly variable soil properties.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Erodibility and highly disturbed soils
Management measures and considerations:
- This map unit is severely limited for lawns and landscaping because of the highly variable soil properties.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

Interpretive Groups

Land capability classification: 7e

UfB—Udorthents-Urban land complex, 0 to 5 percent slopes, occasionally flooded

Setting

Landscape: Mountain valleys, dominantly along the French Broad and Swannanoa Rivers in the central and southern parts of the county
Elevation range: 1,700 to 2,000 feet
Landform: Stream terraces and flood plains
Landform position: Toeslopes and bottomland
Shape of areas: Irregular
Size of areas: Up to 165 acres

Composition

Udorthents and similar inclusions: 60 percent

Urban land: 30 percent
Dissimilar inclusions: 10 percent

Composition

Udorthents and similar inclusions: 45 percent
Urban land: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Udorthents

Udorthents consists of cut and fill areas where soil and the underlying material have been removed and placed on an adjacent site. Areas include highways, building sites, and recreational areas, such as parks, river access points, and campgrounds. Also included are depressions filled with construction debris and covered with soil material. A typical profile is not given due to the variable nature of the soil.

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of Udorthents

Note: Properties are variable and dependent on the type of fill material used or the type of rock exposed at the surface.

Depth class: Very deep
Drainage class: Somewhat excessively drained to moderately well drained
General texture class: Loamy
Permeability: Very rapid to slow
Available water capacity: Low or moderate
Depth to seasonal high water table: Variable; occasionally 3 to 6 feet and more commonly more than 6 feet from January through December
Hazard of flooding: Occasional, throughout the year with standing water for less than 2 days (fig. 17)
Shrink-swell potential: Low
Slope class: Nearly level or gently sloping
Soil slippage potential: None
Extent of erosion: None to moderate
Hazard of water erosion: Moderate to very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that are about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly alkaline throughout the profile
Parent material: Loamy fill material
Depth to bedrock: 40 to more than 60 inches in fill areas
Other distinctive properties: Potential for differential settling: soils subject to overland flow of storm water from adjacent uplands

Figure 17.—A flooding event in an area of Udorthents-Urban land complex, 0 to 5 percent slopes, occasionally flooded. Areas adjacent to stream channels are subject to frequent, occasional, or rare flooding for very brief duration.

Minor Components

Dissimilar inclusions:
- Areas that contain asphalt, wood, glass, and other waste material
- Areas of undisturbed soils around the edge of the map units
- Areas that have boulders on the soil surface
- Areas that are subject to frequent or rare flooding for very brief duration; adjacent to stream channels
- Random areas that are moderately well drained to poorly drained
- Random areas of short, steep to nearly vertical slopes

Similar inclusions:
- Soils that are similar to Udorthents but that have sandy or clayey underlying material

Land Use

An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Interpretive Groups

Land capability classification: Udorthents—7s; Urban land—8

UhE—Udorthents-Urban land complex, 2 to 50 percent slopes

Setting

Landscape: Intermountain hills and low and intermediate mountains, dominantly in the central and southern parts of the county

Elevation range: 1,900 to 3,500 feet
Landform: Ridges, hillslopes, mountain slopes, coves, stream terraces, and flood plains
Landform position: Summits, side slopes, footslopes, and toeslopes
Shape of areas: Irregular
Size of areas: Up to 1,686 acres

Composition

Udorthents and similar inclusions: 55 percent
Urban land: 35 percent
Dissimilar inclusions: 10 percent

Typical Profile

Udorthents

Udorthents consist of cut and fill areas where soil and the underlying material have been removed and placed on an adjacent site. Areas include major highway right-of-way corridors, building sites, quarries, and recreational areas, such as ball fields (fig. 18). A typical profile is not given due to the variable nature of the soil.

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of

Figure 18.—A highway right-of-way corridor and urbanization in an area of Udorthents-Urban land complex, 2 to 50 percent slopes.

flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of Udorthents

Note: Properties are variable and dependent on the type of fill material used or the type of rock exposed at the surface.

Depth class: Deep or very deep
Drainage class: Somewhat excessively drained to moderately well drained
General texture class: Loamy
Permeability: Very rapid to slow
Available water capacity: Low or moderate
Depth to seasonal high water table: Variable; occasionally 3 to 6 feet and more commonly more than 6 feet from January through December
Hazard of flooding: Variable, commonly none or rare throughout the year with standing water for less than 2 days
Shrink-swell potential: Low
Slope class: Nearly level to steep
Soil slippage potential: Medium
Extent of erosion: Slight to severe
Hazard of water erosion: Moderate to very severe
Rock fragments on the surface: Widely scattered surface cobbles and stones that are about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Low
Potential frost action: Moderate
Soil reaction: Very strongly acid to slightly alkaline throughout the profile
Parent material: Loamy fill material
Depth to bedrock: Excavated areas—bedrock commonly exposed at or near the soil surface; fill areas—40 to more than 60 inches
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling

Minor Components

Dissimilar inclusions:
- Areas that contain asphalt, wood, glass, and other waste material
- Areas of undisturbed soils around the edge of the map units
- Areas that have bedrock at a depth of less than 40 inches
- Areas that have boulders on the soil surface
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas that are moderately well drained to poorly drained
- Random areas of short, very steep to nearly vertical slopes

Similar inclusions:
- Soils that are similar to Udorthents but that have sandy or clayey underlying material

Land Use

An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Interpretive Groups

Land capability classification: Udorthents—7s; Urban land—8

UkD—Unaka-Rock outcrop complex, 15 to 30 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains, dominantly in the eastern and western parts of the county
Elevation range: 2,900 to 4,900 feet
Landform: North- to east-facing ridges and mountain slopes and those shaded by the higher mountains
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 27 acres

Composition

Unaka soil and similar inclusions: 40 percent
Rock outcrop: 35 percent
Dissimilar inclusions: 25 percent

Typical Profile

Unaka

Surface layer:
0 to 8 inches—very dark brown loam

Subsoil:
8 to 13 inches—dark yellowish brown loam
13 to 26 inches—yellowish brown cobbly loam

Bedrock:
26 to 31 inches—weathered highly fractured biotite gneiss
31 to 80 inches—unweathered hard, moderately fractured biotite gneiss

Rock outcrop

The Rock outcrop is dominantly biotite gneiss and granite bedrock.

Properties and Qualities of the Unaka Soil

Depth class: Moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to cooler annual air temperatures, which allow

late spring and early fall frosts; higher soil moisture content due to north- to east-facing aspects and shading by the higher mountains; on upper side slopes, soil subject to rime ice in winter and high winds

Soil reaction: Very strongly acid or strongly acid throughout the profile

Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock

Depth to bedrock: 20 to 40 inches to hard bedrock

Other distinctive properties: Random areas of seeps and springs; water movement along bedrock contact

Minor Components

Dissimilar inclusions:
- Random areas of Porters soils that have hard bedrock at a depth of 40 to 60 inches
- Toecane soils that have more rock fragments in the subsoil and have bedrock at a depth of more than 60 inches; below rock outcrops and in drainageways
- Tusquitee soils that have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, on footslopes, and on benches
- Chestnut soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and spur ridges
- Buladean and Edneyville soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 40 to more than 60 inches; on south- to west-facing ridges and mountain slopes
- Random areas of soils that have hard bedrock at a depth of less than 20 inches
- Random areas of soils on less than 15 percent or greater than 30 percent slopes
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Unaka soils that have fine sandy loam surface layers
- Unaka soils that have a surface layer with less organic matter

Land Use

Dominant Uses: Woodland and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the

slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, low volume, very bouldery surface, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, very bouldery surface, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope, very bouldery surface, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, very bouldery surface, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, very bouldery surface, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Unaka—4s; Rock outcrop—8s

UkE—Unaka-Rock outcrop complex, 30 to 50 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains, dominantly in the northeastern, southeastern, and southwestern parts of the county
Elevation range: 2,900 to 4,900 feet
Landform: North- to east-facing ridges and mountain slopes and those shaded by the higher mountains

Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 83 acres

Composition

Unaka soil and similar inclusions: 40 percent
Rock outcrop: 35 percent
Dissimilar inclusions: 25 percent

Typical Profile

Unaka

Surface layer:
0 to 8 inches—very dark brown loam

Subsoil:
8 to 13 inches—dark yellowish brown loam
13 to 26 inches—yellowish brown cobbly loam

Bedrock:
26 to 31 inches—weathered highly fractured biotite gneiss
31 to 80 inches—unweathered hard, moderately fractured biotite gneiss

Rock outcrop

The Rock outcrop is dominantly granite and biotite gneiss bedrock.

Properties and Qualities of the Unaka Soil

Depth class: Moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Medium
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to cooler annual air temperatures, allowing for late spring and early fall frosts, and to higher soil moisture content due to north- to east-facing aspects or shading by the higher mountains
Soil reaction: Very strongly acid or strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; soil slippage potential when soil is saturated or when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of Porters soils that have hard bedrock at a depth of 40 to 60 inches
- Toecane soils that have more rock fragments in the subsoil and have bedrock at a depth of more than 60 inches; below rock outcrops and in drainageways
- Tusquitee soils that have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, on footslopes, and on benches
- Chestnut soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and spur ridges
- Buladean and Edneyville soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 40 to more than 60 inches; on south- to west-facing ridges and mountain slopes
- Random areas of soils that have hard bedrock at a depth of less than 20 inches
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Areas of rubble land; below rock outcrops and in drainageways
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Unaka soils that have fine sandy loam surface layers

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, low volume, depth to bedrock, very bouldery surface, and extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, very bouldery surface, and extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Unaka—6s; Rock outcrop—8s

UkF—Unaka-Rock outcrop complex, 50 to 95 percent slopes, very bouldery

Setting

Landscape: Low and intermediate mountains, dominantly in the northeastern, southeastern, and southwestern parts of the county
Elevation range: 2,900 to 4,900 feet
Landform: North- to east-facing mountain slopes and those shaded by the higher mountains
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 114 acres

Composition

Unaka soil and similar inclusions: 40 percent
Rock outcrop: 35 percent
Dissimilar inclusions: 25 percent

Typical Profile

Unaka

Surface layer:
0 to 8 inches—very dark brown loam

Subsoil:
8 to 13 inches—dark yellowish brown loam
13 to 26 inches—yellowish brown cobbly loam

Bedrock:
26 to 31 inches—weathered highly fractured biotite gneiss
31 to 80 inches—unweathered hard, moderately fractured biotite gneiss

Rock outcrop

The Rock outcrop is dominantly granite and biotite gneiss bedrock.

Properties and Qualities of the Unaka Soil

Depth class: Moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: High
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface stones and boulders that average about 10 to 48 inches in diameter and 10 to 65 feet apart
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Special climatic conditions: Soil subject to cooler annual air temperatures, allowing for late spring and early fall frosts, and to higher soil moisture content due to north- to east-facing aspects or shading by the higher mountains
Soil reaction: Very strongly acid or strongly acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: 20 to 40 inches to hard bedrock
Other distinctive properties: Water movement along bedrock contacts; soil slippage potential when soil is saturated or when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of Porters soils that have hard bedrock at a depth of 40 to 60 inches
- Toecane soils that have more rock fragments in the subsoil and have bedrock at a depth of more than 60 inches; below rock outcrops and in drainageways
- Tusquitee soils that have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, on footslopes, and on benches
- Chestnut soils that have thinner surface layers with less organic matter and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and spur ridges
- Buladean and Edneyville soils that have thinner surface layers with less organic

matter and have soft bedrock at a depth of 40 to more than 60 inches; on south- to west-facing ridges and mountain slopes
- Random areas of soils that have hard bedrock at a depth of less than 20 inches
- Random areas of soils on less than 50 percent or greater than 95 percent slopes
- Areas of rubble land; below rock outcrops and in drainageways
- Prominent ridges and upper side slopes that are subject to frequent rime ice in winter and high winds year-round

Similar inclusions:
- Unaka soils that have fine sandy loam surface layers

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, low volume, very bouldery surface, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, very bouldery surface, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope, very bouldery surface, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, extent of rock outcrops, and very bouldery surface. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Unaka—7s; Rock outcrop—8s

UnB—Unison loam, 2 to 8 percent slopes

Setting

Landscape: Mountain valleys of low mountains and intermountain hills, dominantly in the south-central and southeastern parts of the county
Elevation range: 1,900 to 2,500 feet
Landform: Coves and high stream terraces
Landform position: Footslopes, toeslopes, and benches
Shape of areas: Long and narrow or irregular
Size of areas: Up to 46 acres

Composition

Unison soil and similar inclusions: 90 percent
Dissimilar inclusions: 10 percent

Typical Profile

Surface layer:
0 to 10 inches—dark yellowish brown loam

Subsoil:
10 to 41 inches—strong brown clay
41 to 53 inches—yellowish brown clay loam
53 to 71 inches—strong brown gravelly sandy clay loam

Underlying material:
71 to 83 inches—strong brown cobbly sandy clay loam

Soil Properties and Qualities

Depth class: Very deep

Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid in the A and B horizons; strongly acid to neutral in the underlying material
Parent material: Old alluvium and colluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content; random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Soils that are moderately eroded; in cropped fields
- Random areas of Tate soils that have less clay in the subsoil
- Moderately well drained to poorly drained soils; in depressions and on toeslopes
- Somewhat poorly drained French soils that are loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Urban land in and around towns in the central and southeastern parts of the county
- Udorthents, loamy, in and around towns in the central and southeastern parts of the county
- Random areas of soils on less than 2 percent or greater than 8 percent slopes

Similar inclusions:
- Unison soils that have surface layers of fine sandy loam, silt loam, sandy clay loam, and clay loam
- Unison soils that have more organic matter in the surface layer

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion,

maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, root penetration, pesticide retention, and soil fertility
Management measures and considerations:
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Well suited to orchards; suited to ornamentals
Management concerns: Erodibility, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.

- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: High for cove hardwoods and eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Well suited
Management concerns: Erodibility, high clay content, shrink-swell potential, corrosivity, seeps and springs, and large stones
Management measures and considerations:

- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.

- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Large stones may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones may be encountered during excavation.

Local roads and streets

Suitability: Well suited
Management concerns: Low strength, high clay content, erodibility, frost action, and seeps and springs
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of

the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: 2e

UnC—Unison loam, 8 to 15 percent slopes

Setting

Landscape: Mountain valleys of low mountains and intermountain hills, dominantly in the south-central and southeastern parts of the county
Elevation range: 1,900 to 2,500 feet
Landform: Coves and high stream terraces
Landform position: Footslopes, toeslopes, and benches
Shape of areas: Long and narrow or irregular
Size of areas: Up to 43 acres

Composition

Unison soil and similar inclusions: 90 percent
Dissimilar inclusions: 10 percent

Typical Profile

Surface layer:
0 to 10 inches—dark yellowish brown loam

Subsoil:
10 to 41 inches—strong brown clay
41 to 53 inches—yellowish brown clay loam
53 to 71 inches—strong brown gravelly sandy clay loam

Underlying material:
71 to 83 inches—strong brown cobbly sandy clay loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate

Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid in the A and B horizons; strongly acid to neutral in the underlying material
Parent material: Old alluvium and colluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content; random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Soils that are moderately eroded; in cropped fields
- Random areas of Tate soils that have less clay in the subsoil
- Moderately well drained to poorly drained soils; in depressions and on toeslopes
- Somewhat poorly drained French soils that are loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Urban land in and around towns in the central and southeastern parts of the county
- Udorthents, loamy, in and around towns in the central and southeastern parts of the county
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Unison soils that have surface layers of fine sandy loam, silt loam, sandy clay loam, and clay loam
- Unison soils that have more organic matter in the surface layer

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, equipment use, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.

- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Well suited
Management concerns: Equipment use, erodibility, root penetration, pesticide retention, and soil fertility
Management measures and considerations:
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Using perennial grasses and legumes helps to penetrate and break up the clayey root zone.
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Well suited to orchards; suited to ornamentals
Management concerns: Erodibility, equipment use, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- The slope may limit the use of equipment in the steeper areas.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: High for cove hardwoods and eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, shrink-swell potential, high clay content, corrosivity, seeps and springs, and large stones
Management measures and considerations:
- Designing structures so that they conform to natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.

- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, slope, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, high clay content, slope, erodibility, frost action, and seeps and springs
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.

- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: 3e

UnD—Unison loam, 15 to 30 percent slopes

Setting

Landscape: Mountain valleys of low mountains and intermountain hills, dominantly in the south-central and southeastern parts of the county
Elevation range: 1,900 to 2,500 feet
Landform: Coves and high stream terraces
Landform position: Footslopes, toeslopes, and benches
Shape of areas: Long and narrow or irregular
Size of areas: Up to 10 acres

Composition

Unison soil and similar inclusions: 90 percent
Dissimilar inclusions: 10 percent

Typical Profile

Surface layer:
0 to 10 inches—dark yellowish brown loam

Subsoil:
10 to 41 inches—strong brown clay
41 to 53 inches—yellowish brown clay loam
53 to 71 inches—strong brown gravelly sandy clay loam

Underlying material:
71 to 83 inches—strong brown cobbly sandy clay loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None

Shrink-swell potential: Moderate
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid in the A and B horizons; strongly acid to neutral in the underlying material
Parent material: Old alluvium and colluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content; random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Soils that are moderately eroded; in cropped fields
- Random areas of Tate soils that have less clay in the subsoil
- Moderately well drained to poorly drained soils; in depressions and on toeslopes
- Somewhat poorly drained French soils that are loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Urban land in and around towns in the central and southeastern parts of the county
- Udorthents, loamy, in and around towns in the central and southeastern parts of the county
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Unison soils that have surface layers of fine sandy loam, silt loam, sandy clay loam, and clay loam
- Unison soils that have more organic matter in the surface layer

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Equipment use, erodibility, tilth, root penetration, pesticide retention, soil fertility, and climate
Management measures and considerations:
- This soil is difficult to manage for cultivated crops because the slope limits equipment use.
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.

- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.

Pasture and hayland

Suitability: Suited
Management concerns: Equipment use, erodibility, root penetration, pesticide retention, and soil fertility
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Suited
Management concerns: Equipment use, erodibility, root disease, climate, ball and burlap harvesting, pesticide retention, and soil fertility
Management measures and considerations:
- This soil may be difficult to manage for orchard or ornamental crops because the slope limits equipment use.
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.

- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.

Woodland Management and Productivity

Potential for commercial species: High for cove hardwoods and eastern white pine
Suitability: Suited
Management concerns: Erodibility and equipment use
Management measures and considerations:

- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, shrink-swell potential, high clay content, corrosivity, seeps and springs, and large stones
Management measures and considerations:

- Designing structures so that they conform to natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.

- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Large stones and boulders may be encountered during excavation.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope, restricted permeability, high clay content, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones and boulders may be encountered during excavation.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, high clay content, slope, erodibility, frost action, and seeps and springs
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to pevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of

the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: 4e

UrB—Unison-Urban land complex, 2 to 8 percent slopes

Setting

Landscape: Mountain valleys of low mountains and intermountain hills, dominantly in the south-central and southeastern parts of the county
Elevation range: 1,900 to 2,500 feet
Landform: Coves and high stream terraces
Landform position: Footslopes, toeslopes, and benches
Shape of areas: Long and narrow or irregular
Size of areas: Up to 61 acres

Composition

Unison soil and similar inclusions: 50 percent
Urban land: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Unison

Surface layer:
0 to 10 inches—dark yellowish brown loam

Subsoil:
10 to 41 inches—strong brown clay
41 to 53 inches—yellowish brown clay loam
53 to 71 inches—strong brown gravelly sandy clay loam

Underlying material:
71 to 83 inches—strong brown cobbly sandy clay loam

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the

drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Unison Soil

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid in the A and B horizons; strongly acid to neutral in the underlying material
Parent material: Old alluvium and colluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content; random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Udorthents, loamy, in and around towns in the central and southeastern parts of the county
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas of short, steep slopes
- Moderately well drained to poorly drained soils; in depressions and on toeslopes
- Random areas of soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of soils that have less clay and more mica in the subsoil
- Random areas of soils that are moderately eroded; in cropped fields
- Random areas of Tate soils that have less clay in the subsoil
- Somewhat poorly drained French soils that are loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Random areas of soils on less than 2 percent or greater than 8 percent slopes

Similar inclusions:
- Unison soils that have surface layers of fine sandy loam, silt loam, sandy clay loam, and clay loam
- Unison soils that have more organic matter in the surface layer
- Redder Braddock soils in the slightly higher-lying positions

Land Use

Dominant Uses: Building site development
Other Uses: Cropland, pasture, and hayland

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Well suited
Management concerns: Erodibility, high clay content, shrink-swell potential, corrosivity, seeps and springs, and large stones
Management measures and considerations:
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- The Unison soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Large stones may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones may be encountered during excavation.

Local roads and streets

Suitability: Well suited
Management concerns: Low strength, high clay content, erodibility, frost action, and seeps and springs
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The Unison soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- The Unison soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: Unison—2e; Urban land—8

UrC—Unison-Urban land complex, 8 to 15 percent slopes

Setting

Landscape: Mountain valleys of low mountains and intermountain hills, dominantly in the south-central and southeastern parts of the county
Elevation range: 1,900 to 2,500 feet
Landform: Coves and high stream terraces
Landform position: Footslopes, toeslopes, and benches
Shape of areas: Long and narrow or irregular
Size of areas: Up to 21 acres

Composition

Unison soil and similar inclusions: 50 percent
Urban land: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Unison

Surface layer:
0 to 10 inches—dark yellowish brown loam

Subsoil:
10 to 41 inches—strong brown clay
41 to 53 inches—yellowish brown clay loam
53 to 71 inches—strong brown gravelly sandy clay loam

Underlying material:
71 to 83 inches—strong brown cobbly sandy clay loam

Urban land

Urban land consists of areas where 85 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas. A typical profile is not given due to the variable nature of the soil. An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Properties and Qualities of the Unison Soil

Depth class: Very deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate

Potential frost action: Moderate
Special climatic conditions: Soil subject to slow air drainage, allowing for late spring and early fall frosts
Soil reaction: Very strongly acid to moderately acid in the A and B horizons; strongly acid to neutral in the underlying material
Parent material: Old alluvium and colluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Subsoil with a high clay content; random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Udorthents, loamy, in and around towns in the central and southeastern parts of the county
- Areas that are subject to frequent, occasional, or rare flooding for very brief duration; adjacent to stream channels
- Random areas of short, steep slopes
- Moderately well drained to poorly drained soils; in depressions and on toeslopes
- Random areas of soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of soils that have less clay and more mica in the subsoil
- Random areas of soils that are moderately eroded; in cropped fields
- Random areas of Tate soils that have less clay in the subsoil
- Somewhat poorly drained French soils that are loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; along stream channels
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Unison soils that have surface layers of fine sandy loam, silt loam, sandy clay loam, and clay loam
- Unison soils that have more organic matter in the surface layers
- Redder Braddock soils in the slightly higher-lying positions

Land Use

Dominant Uses: Building site development
Other Uses: Cropland, pasture, and hayland

Agricultural Development

Cropland

- This map unit is not managed for cropland.

Pasture and hayland

- This map unit is not managed for pasture and hayland.

Orchard and ornamental crops

- This map unit is not managed for orchard or ornamental crops.

Woodland Management and Productivity

- This map unit is not managed for timber production.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, shrink-swell potential, corrosivity, seeps and springs, and large stones
Management measures and considerations:
- Designing structures so that they conform to natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content of this soil, revegetating cut and fill slopes can be difficult.
- The Unison soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Locating structures away from intermittent and perennial drainageways helps to minimize structural damage from overland flow of storm water.
- Large stones may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, seeps and springs, and large stones
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Excavations may cut into seeps and springs. These areas should be avoided.
- Large stones may be encountered during excavation.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, high clay content, slope, erodibility, frost action, and seeps and springs
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- The Unison soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.

- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.
- Intercepting and diverting underground water from seeps and springs helps to stabilize cut and fill slopes.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, climate, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high clay content, revegetating cut and fill slopes can be difficult.
- The Unison soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: Unison—3e; Urban land—8

Ux—Urban land

This map unit consists of areas where 90 percent of the surface is covered with buildings, streets, parking lots, and other impervious material. The natural soils are paved over, covered, or greatly altered by cutting, filling, or grading during the process of urban development. The original landscape and topography and commonly the drainage pattern have been changed. Runoff is very rapid and increases the hazard of flooding in low-lying areas.

The land capability class is 8.

W—Water

This map unit consists of bodies of water, such as lakes, ponds, and borrow pits filled with water after mining operations have ceased. It also includes areas of wide perennial streams or rivers. No interpretations are given for this map unit.

WaC2—Walnut-Oteen-Mars Hill complex, 8 to 15 percent slopes, moderately eroded

Setting

Landscape: Low and intermediate mountains, dominantly in the central and northeastern parts of the county
Elevation range: 2,200 to 3,800 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow or irregular
Size of areas: Up to 56 acres

Composition

Walnut soil and similar inclusions: 40 percent
Oteen soil and similar inclusions: 35 percent
Mars Hill soil and similar inclusions: 20 percent
Dissimilar inclusions: 5 percent

Typical Profile

Walnut

Surface layer:
0 to 2 inches—brown fine sandy loam

Subsoil:
2 to 21 inches—strong brown loam
21 to 27 inches—strong brown gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered migmatitic gneiss bedrock

Oteen

Surface layer:
0 to 2 inches—dark brown fine sandy loam

Subsoil:
2 to 11 inches—dark yellowish brown fine sandy loam

Underlying material:
11 to 15 inches—dark yellowish brown very gravelly sandy loam saprolite

Bedrock:
15 to 80 inches—weathered, migmatitic gneiss bedrock

Mars Hill

Surface layer:
0 to 3 inches—dark yellowish brown loam
3 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 35 inches—dark yellowish brown fine sandy loam

Underlying material:
35 to 46 inches—dark yellowish brown fine sandy loam saprolite

Bedrock:
46 to 80 inches—weathered migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Walnut—moderately deep; Oteen—shallow; Mars Hill—deep
Drainage class: Walnut and Mars Hill—well drained; Oteen—somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Walnut—low; Oteen—very low; Mars Hill—moderate;
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid or strongly acid in the A horizon and strongly acid to neutral in the lower horizons
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Walnut—20 to 40 inches to soft bedrock; Oteen—10 to 20 inches to soft bedrock; Mars Hill—40 to 60 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of soils that have more mica in the subsoil and have soft bedrock at a depth of 10 to more than 60 inches
- Cowee and Evard soils that have more clay in the subsoil, have a lower pH, and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes and nose slopes
- Brown soils that have more clay in the subsoil, have a lower pH, and have soft bedrock at a depth of 20 to more than 60 inches; on side slopes
- Tate soils that have thicker surface layers with more organic matter, have more clay in the subsoil, and have bedrock at a depth of more than 60 inches; in saddles and gaps
- Random soils that are similar to Clifton soils but have soft bedrock at a depth of less than 60 inches
- Widely scattered areas of rock outcrop; on narrow ridges
- Random areas of soils that have soft bedrock at a depth of 1 to 10 inches
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Walnut, Oteen, and Mars Hill soils that have sandy loam and loam surface layers

Land Use

Dominant Uses: Pasture, hayland, and building site development,
Other Uses: Cropland, woodland, wildlife habitat, and recreation

Agricultural Development

Cropland

Suitability: Unsuited

Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Walnut and Oteen—erodibility, equipment use, soil fertility, rooting depth, and droughtiness; Mars Hill—erodibility, equipment use, soil fertility, and rooting depth
Management measures and considerations:
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- The slope limits equipment use in the steeper areas.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep and shallow rooting depth, the Walnut and Oteen soils are difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops due to the moderately deep and shallow rooting depth of the Walnut and Oteen soils. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderate to moderately high for eastern white pine
Suitability: Poorly suited
Management concerns: Walnut and Oteen—equipment use, erodibility, and windthrow hazard; Mars Hill—equipment use and erodibility
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Walnut and Oteen soils because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Walnut and Oteen—slope, erodibility, droughtiness, soil fertility, depth to bedrock, and droughtiness; Mars Hill—slope, erodibility, droughtiness, soil fertility, and depth to bedrock
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control

structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep and shallow rooting depth, the Walnut and Oteen soils are difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: Walnut and Mars Hill—3e; Oteen—7s

WaD2—Walnut-Oteen-Mars Hill complex, 15 to 30 percent slopes, moderately eroded

Setting

Landscape: Low and intermediate mountains, dominantly in the central and northeastern parts of the county
Elevation range: 2,200 to 3,800 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: Up to 89 acres

Composition

Walnut soil and similar inclusions: 40 percent
Oteen soil and similar inclusions: 35 percent
Mars Hill soil and similar inclusions: 20 percent
Dissimilar inclusions: 5 percent

Typical Profile

Walnut

Surface layer:
0 to 2 inches—brown fine sandy loam

Subsoil:
2 to 21 inches—strong brown loam
21 to 27 inches—strong brown gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered migmatitic gneiss bedrock

Oteen

Surface layer:
0 to 2 inches—dark brown fine sandy loam

Subsoil:
2 to 11 inches—dark yellowish brown fine sandy loam

Underlying material:
11 to 15 inches—dark yellowish brown very gravelly sandy loam saprolite

Bedrock:
15 to 80 inches—weathered migmatitic gneiss bedrock

Mars Hill

Surface layer:
0 to 3 inches—dark yellowish brown loam
3 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 35 inches—dark yellowish brown fine sandy loam

Underlying material:
35 to 46 inches—dark yellowish brown fine sandy loam saprolite

Bedrock:
46 to 80 inches—weathered migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Walnut—moderately deep; Oteen—shallow; Mars Hill—deep
Drainage class: Walnut and Mars Hill—well drained; Oteen—somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Walnut—low; Oteen—very low; Mars Hill—moderate;
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate
Soil reaction: Very strongly acid or strongly acid in the A horizon and strongly acid to neutral in the lower horizons
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Walnut—20 to 40 inches to soft bedrock; Oteen—10 to 20 inches to soft bedrock; Mars Hill—40 to 60 inches to soft bedrock

Minor Components

Dissimilar inclusions:
- Random areas of soils that have more mica in the subsoil and have soft bedrock at a depth of 10 to more than 60 inches
- Cowee and Evard soils that have more clay in the subsoil, have a lower pH, and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes and nose slopes
- Brown soils that have more clay in the subsoil, have a lower pH, and have soft bedrock at a depth of 20 to more than 60 inches; on side slopes
- Tate soils that have thicker surface layers with more organic matter, have more clay in the subsoil, and have bedrock at a depth of more than 60 inches; in saddles and gaps

- Random soils that are similar to Clifton soils but have soft bedrock at a depth of less than 60 inches
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils that have soft bedrock at a depth of 1 to 10 inches
- Widely scattered areas of rock outcrop; on narrow ridges
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Walnut, Oteen, and Mars Hill soils that have sandy loam and loam surface layers

Land Use

Dominant Uses: Pasture, hayland, and building site development,
Other Uses: Cropland, woodland, wildlife habitat, and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Walnut and Oteen—equipment use, erodibility, soil fertility, rooting depth, and droughtiness; Mars Hill—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep and shallow rooting depth, the Walnut and Oteen soils are difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops due to the moderately deep and shallow rooting depth of the Walnut and Oteen soils. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderate to moderately high for eastern white pine
Suitability: Poorly suited
Management concerns: Walnut and Oteen—equipment use, erodibility, and windthrow hazard; Mars Hill—equipment use and erodibility

Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Walnut and Oteen soils because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Slope and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Walnut and Oteen—slope, erodibility, soil fertility, depth to bedrock, and droughtiness; Mars Hill—slope, erodibility, soil fertility, and depth to bedrock
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep and shallow rooting depth, the Walnut and Oteen soils are difficult to manage for lawns and landscaping, especially if the soil has been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: Walnut and Mars Hill—4e; Oteen—7s

WaE2—Walnut-Oteen-Mars Hill complex, 30 to 50 percent slopes, moderately eroded

Setting

Landscape: Low and intermediate mountains, dominantly in the central and northeastern parts of the county
Elevation range: 2,200 to 3,800 feet
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 183 acres

Composition

Walnut soil and similar inclusions: 40 percent
Oteen soil and similar inclusions: 35 percent
Mars Hill soil and similar inclusions: 20 percent
Dissimilar inclusions: 5 percent

Typical Profile

Walnut

Surface layer:
0 to 2 inches—brown fine sandy loam

Subsoil:
2 to 21 inches—strong brown loam
21 to 27 inches—strong brown gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered migmatitic gneiss bedrock

Oteen

Surface layer:
0 to 2 inches—dark brown fine sandy loam

Subsoil:
2 to 11 inches—dark yellowish brown fine sandy loam

Underlying material:
11 to 15 inches—dark yellowish brown very gravelly sandy loam saprolite

Bedrock:
15 to 80 inches—weathered migmatitic gneiss bedrock

Mars Hill

Surface layer:
0 to 3 inches—dark yellowish brown loam
3 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 35 inches—dark yellowish brown fine sandy loam

Underlying material:
35 to 46 inches—dark yellowish brown fine sandy loam saprolite

Bedrock:
46 to 80 inches—weathered migmatitic gneiss bedrock

Soil Properties and Qualities

Depth class: Walnut—moderately deep; Oteen—shallow; Mars Hill—deep
Drainage class: Walnut and Mars Hill—well drained; Oteen—somewhat excessively drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Walnut—low; Oteen—very low; Mars Hill—moderate;
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Moderate, about 25 to 75 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low or moderate
Potential frost action: Moderate

Soil reaction: Very strongly acid or strongly acid in the A horizon and strongly acid to neutral in the lower horizons
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Walnut—20 to 40 inches to soft bedrock; Oteen—10 to 20 inches to soft bedrock; Mars Hill—40 to 60 inches to soft bedrock
Other distinctive properties: Potential for downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of soils that have more mica in the subsoil and have soft bedrock at a depth of 10 to more than 60 inches
- Cowee and Evard soils that have more clay in the subsoil, have a lower pH, and have soft bedrock at a depth of 20 to more than 60 inches; on shoulder slopes and nose slopes
- Brown soils that have more clay in the subsoil, have a lower pH, and have soft bedrock at a depth of 20 to to more than 60 inches; on side slopes
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Widely scattered areas of rock outcrop; on narrow ridges and side slopes
- Random areas of severely eroded soils where underlying material is exposed at the surface
- Random areas of soils that have soft bedrock at a depth of 1 to 10 inches
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways, below rock outcrops, and on benches and toeslopes
- Random areas of soils on less than 30 percent or greater than 50 percent slopes

Similar inclusions:
- Walnut, Oteen, and Mars Hill soils that have sandy loam and loam surface layers

Land Use

Dominant Uses: Pasture, woodland, and wildlife habitat
Other Uses: Building site development and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and depth to bedrock. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Walnut and Oteen—equipment use, erodibility, soil fertility, rooting depth, and droughtiness; Mars Hill—equipment use, erodibility, soil fertility, and rooting depth
Management measures and considerations:
- Because of the slope, this map unit is difficult to manage for pasture or hayland.

- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep and shallow rooting depth, the Walnut and Oteen soils are difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops due to the slope and the moderately deep and shallow rooting depth of the Walnut and Oteen soils. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderate to moderately high for eastern white pine
Suitability: Poorly suited
Management concerns: Walnut and Oteen—equipment use, erodibility, and windthrow hazard; Mars Hill—equipment use and erodibility
Management measures and considerations:
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Productivity is limited in areas of the Walnut and Oteen soils because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, corrosivity, and depth to bedrock
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit.
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.

- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Using corrosion-resistant materials helps to reduce the risk of damage to concrete.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tanks because of the slope and depth to bedrock. A site should be selected on better suited soils.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, slippage, erodibility, depth to bedrock, and frost action
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for access roads.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the droughty nature of these soils, revegetating cut and fill slopes can be difficult.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- The soft bedrock underlying these soils should not be difficult to excavate but will be difficult to vegetate and pack into a fill slope.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Walnut and Oteen—slope, erodibility, soil fertility, depth to bedrock, and droughtiness; Mars Hill—slope, erodibility, soil fertility, and depth to bedrock
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Using lime, fertilizer, mulch, irrigation, and varieties adapted to droughty conditions helps to establish lawns and landscape plants.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep and shallow rooting depth, the Walnut and Oteen soils are difficult to manage for lawns and landscaping, especially if the soils have been disturbed.
- If excavated material is to be used for landscaping, any soft bedrock will need to be crushed or removed.

Interpretive Groups

Land capability classification: Walnut and Mars Hill—6e; Oteen—7s

WnF—Walnut-Oteen-Rock outcrop complex, 50 to 95 percent slopes

Setting

Landscape: Low and intermediate mountains, dominantly in the central and northeastern parts of the county
Elevation range: 1,700 to 3,800 feet
Landform: Mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 85 acres

Composition

Walnut soil and similar inclusions: 40 percent
Oteen soil and similar inclusions: 30 percent
Rock outcrop: 20 percent
Dissimilar inclusions: 10 percent

Typical Profile

Walnut

Surface layer:
0 to 3 inches—brown fine sandy loam
3 to 9 inches—dark yellowish brown fine sandy loam

Subsoil:
9 to 21 inches—strong brown loam
21 to 27 inches—strong brown very gravelly fine sandy loam

Bedrock:
27 to 80 inches—weathered migmatitic gneiss bedrock

Oteen

Surface layer:
0 to 2 inches—dark brown fine sandy loam

Subsoil:
2 to 11 inches—dark yellowish brown fine sandy loam

Underlying material:
11 to 15 inches—dark yellowish brown very gravelly sandy loam saprolite

Bedrock:
15 to 80 inches—weathered migmatitic gneiss bedrock

Rock outcrop

The Rock outcrop is dominantly migmatitic gneiss bedrock.

Properties and Qualities of the Walnut and Oteen Soils

Depth class: Walnut—moderately deep; Oteen—shallow
Drainage class: Walnut—well drained; Oteen—somewhat excessively drained
General texture class: Loamy

Permeability: Moderately rapid
Available water capacity: Walnut—low; Oteen—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Walnut—medium; Oteen—high
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Organic matter content of surface layer: Low to high
Potential frost action: Moderate
Soil reaction: Very strongly acid or strongly acid in the A horizon and strongly acid to neutral in the lower horizons
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Walnut—20 to 40 inches to soft bedrock; Oteen—10 to 20 inches to soft bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed

Minor Components

Dissimilar inclusions:
- Random areas of Mars Hill soils that have soft bedrock at a depth of 40 to 60 inches
- Random areas of soils that have more mica in the subsoil and have soft bedrock at a depth of 10 to more than 60 inches
- Toecane soils that have thicker surface layers with more organic matter, have more rock fragments in the subsoil, and have bedrock at a depth of more than 60 inches; in drainageways, below rock outcrops, and on benches and toeslopes
- Tate and Tusquitee soils that have thicker surface layers with more organic matter and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and on footslopes
- Cowee soils that have more clay in the subsoil, have a lower pH, and have soft bedrock at a depth of 20 to 40 inches; on shoulder slopes and nose slopes
- Brown soils that have more clay in the subsoil, have a lower pH, and have soft bedrock at a depth of 20 to 40 inches; on side slopes
- Soils that have thicker surface layers with more organic matter; on north- to east-facing side slopes
- Random areas of soils that have soft bedrock at a depth of 1 to 10 inches
- Random areas of soils on less than 50 percent or greater than 95 percent slopes

Similar inclusions:
- Walnut and Oteen soils that have sandy loam and loam surface layers

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for pasture and hay production because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of the slope, erodibility, low productivity, low volume, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tanks because of the slope, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: Walnut—7e; Oteen—7s; Rock outcrop—8s

WoE—Wayah-Burton complex, 30 to 50 percent slopes, bouldery

Setting

Landscape: High mountains in the northeast, near Craggy Gardens, and in the southwest, near Mt. Pisgah
Elevation range: 4,700 to 5,100 feet
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Long and narrow on summits and irregular on side slopes
Size of areas: Up to 21 acres

Composition

Wayah soil and similar inclusions: 50 percent
Burton soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Wayah

Surface layer:
0 to 14 inches—very dark brown loam

Subsoil:
14 to 48 inches—yellowish brown sandy loam

Underlying material:
48 to 80 inches—brown gravelly sandy loam saprolite

Burton

Surface layer:
0 to 17 inches—very dark brown sandy clay loam

Subsoil:
17 to 29 inches—dark yellowish brown sandy loam

Bedrock:
29 to 80 inches—unweathered hard metagraywacke

Soil Properties and Qualities

Depth class: Wayah—very deep; Burton—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Wayah—moderate; Burton—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart

Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and frequent rime ice in winter
Soil reaction: Wayah—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the lower horizons; Burton—extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Wayah—more than 60 inches; Burton—20 to 40 inches to hard bedrock
Other distinctive properties: Random areas of seeps and springs; potential for downslope movement when lateral support is removed; water movement along bedrock contacts in the Burton soil

Minor Components

Dissimilar inclusions:
- Craggey soils that have hard bedrock at a depth of 10 to 20 inches; in areas adjacent to rock outcrops
- Balsam soils that have more rock fragments in the subsoil than the Wayah and Burton soils; in concave areas at the head of drains and in drainageways
- Tanasee soils that have a loamy subsoil and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, in drainageways, and on benches and footslopes
- Random areas of soils that have a high mica content in the subsoil and underlying material
- Widely scattered areas of rock outcrop
- Random areas of soils on less than 30 percent or greater than 50 percent slopes
- Balsam soils that have more rock fragments in the subsoil than the Wayah and Burton soils; in concave areas at the head of drains and in drainageways
- Craggey soils that have hard bedrock at a depth of 10 to 20 inches; in areas adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Tanasee soils that have a loamy subsoil and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in saddles and gaps
- Exposed areas that are windswept or ice damaged

Similar inclusions:
- Wayah soils that have fine sandy loam and sandy loam surface layers
- Burton soils that have coarse sandy loam, fine sandy loam, and loam surface layers
- Random areas of similar soils that have bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Wildlife habitat and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, short growing season, and bouldery surface. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Wayah—equipment use, erodibility, climate, pesticide retention, soil fertility, and rooting depth; Burton—equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- This map unit is severely limited for pasture and hayland because of the slope, erodibility, bouldery surface, damaging high winds, and short growing season.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Burton soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, damaging high winds, short growing season, bouldery surface, and the depth to bedrock and droughtiness of the Burton soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for red spruce and moderate for northern hardwoods
Suitability: Poorly suited
Management concerns: Wayah—climate, equipment use, and erodibility; Burton—climate, equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- Productivity is limited because of the short growing season and other climatic conditions associated with the higher elevations.
- Using cable logging methods helps to minimize road and trail construction, especially in areas where slope exceeds 40 percent.
- Designing roads on the contour, installing water-control structures, such as broad-based dips, water bars, and culverts, and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soils are wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope and the high content of organic matter in the surface layer.
- Avoiding logging operations during periods when the soils are saturated helps to prevent rutting of the soil surface and damage to tree roots from compaction.
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.

- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be allowed to graze in areas managed for woodland.
- These soils are best reforested by managing for natural regeneration of northern hardwoods and, above 5,300 feet in elevation, red spruce.
- Productivity is limited in areas of the Burton soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, and corrosivity; Burton—slope, erodibility, climate, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Design modifications are needed to overcome prolonged freezing temperatures and high winds.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of the Burton soil.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wayah—slope, climate, and prolonged freezing temperatures; Burton—slope, climate, prolonged freezing temperatures, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Design modifications are needed to overcome prolonged freezing temperatures.
- Locating and using areas of the deeper Wayah soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, and frost action; Burton—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Blasting or special grading equipment is needed to construct roads on the Burton soil.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, pesticide retention, soil

fertility, and depth to bedrock; Burton—slope, erodibility, climate, pesticide retention, soil fertility, depth to bedrock, and droughtiness

Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Due to a short growing season, the use of native, winter-hardy landscape plants is recommended.
- This map unit is subject to damaging high winds and may be unsuitable for some types of landscaping.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Burton soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Groups

Land capability classification: 7s

WpF—Wayah-Burton complex, 50 to 95 percent slopes, very rocky

Setting

Landscape: High mountains in the northeast, near Craggy Gardens, and in the southwest, near Mt. Pisgah
Elevation range: 4,700 to 5,100 feet
Landform: Mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 82 acres

Composition

Wayah soil and similar inclusions: 45 percent
Burton soil and similar inclusions: 35 percent
Dissimilar inclusions: 20 percent

Typical Profile

Wayah

Surface layer:
0 to 6 inches—very dark brown loam
6 to 12 inches—very dark grayish brown loam

Subsoil:
12 to 22 inches—dark yellowish brown sandy loam
22 to 51 inches—yellowish brown gravelly sandy loam

Underlying material:
51 to 81 inches—dark yellowish brown cobbly coarse sandy loam saprolite

Burton

Surface layer:
0 to 9 inches—very dark brown sandy clay loam
9 to 17 inches—very dark grayish brown fine sandy loam

Subsoil:
17 to 26 inches—dark yellowish brown sandy loam

Bedrock:
26 to 29 inches—weathered strongly cemented metagraywacke
29 to 81 inches—unweathered hard metagraywacke

Soil Properties and Qualities

Depth class: Wayah—very deep; Burton—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Wayah—moderate; Burton—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Extent of rock outcrop: About 10 percent on the soil surface
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high rainfall, and a short growing season
Soil reaction: Wayah—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the lower horizons; Burton—extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Wayah—more than 60 inches; Burton—20 to 40 inches to hard bedrock
Other distinctive properties: Random areas of seeps and springs; water movement along bedrock contacts in the Burton soil

Minor Components

Dissimilar inclusions:
- Craggey soils that have hard bedrock at a depth of 10 to 20 inches; in areas adjacent to rock outcrops
- Balsam soils that have more rock fragments in the subsoil than the Wayah and Burton soils; in concave areas at the head of drains and in drainageways

- Tanasee soils that have a loamy subsoil and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, in drainageways, and on benches and footslopes
- Random areas of soils that have a high content of mica in the subsoil and underlying material
- Random areas of Clingman and similar soils that have an organic peat surface layer and have hard bedrock at a depth of 2 to 20 inches; in areas adjacent to rock outcrops
- Random areas of soils on less than 50 percent or greater than 95 percent slopes
- Soils that have a warmer temperature regime; on south- to west-facing ridges and mountain slopes, at the lower elevations near the mesic and frigid soil temperature separation
- Widely scattered areas of rock outcrop

Similar inclusions:
- Wayah soils that have fine sandy loam and sandy loam surface layers
- Burton soils that have coarse sandy loam, fine sandy loam, and loam surface layers
- Random areas of similar soils that have bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Wildlife habitat and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, short growing season, depth to bedrock, extent of rock outcrops, and the droughtiness of the Burton soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Moderately high for red spruce and moderate for northern hardwoods
Suitability: Poorly suited
Management concerns: Wayah—climate, equipment use, and erodibility; Burton—climate, equipment use, erodibility, and windthrow hazard
Management measures and considerations:
- Productivity is limited because of the short growing season and other climatic conditions associated with the higher elevations.

- Using cable logging methods helps to overcome equipment limitations and prevents the acceleration of erosion caused by road construction, use of skid trails, and disturbance of the forest floor by heavy machinery.
- Designing roads on the contour, installing water-control structures, such as broad-based dips, water bars, and culverts, and avoiding the diversion of water directly onto fill slopes help to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Blasting, shaping, and grading are needed if roads are to be constructed on the contour.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to minimize siltation and provides shade for the aquatic habitat.
- Livestock should not be allowed to graze in areas managed for woodland.
- These soils are best reforested by managing for natural regeneration of northern hardwoods and, above 5,300 feet in elevation, red spruce.
- Productivity is limited in areas of the Burton soil because of the limited rooting depth.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope, depth to bedrock, and extent of rock outcrops. The local Health Department should be contacted for additional guidance.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, depth to bedrock, and extent of rock outcrops. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7s

WrC—Wayah-Burton complex, windswept, 8 to 15 percent slopes, bouldery

Setting

Landscape: High mountains in the northeast, near Craggy Gardens, and in the southwest, near Mt. Pisgah
Elevation range: 4,800 to 6,200 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow or irregular
Size of areas: Up to 8 acres

Composition

Wayah soil and similar inclusions: 50 percent
Burton soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Wayah

Surface layer:
0 to 14 inches—very dark brown loam

Subsoil:
14 to 48 inches—yellowish brown sandy loam

Underlying material:
48 to 80 inches—brown gravelly sandy loam saprolite

Burton

Surface layer:
0 to 15 inches—very dark brown sandy clay loam

Subsoil:
15 to 24 inches—dark yellowish brown sandy loam

Bedrock:
24 to 80 inches—unweathered hard metagraywacke

Soil Properties and Qualities

Depth class: Wayah—very deep; Burton—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Wayah—moderate; Burton—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart

Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Wayah—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the lower horizons; Burton—extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Wayah—more than 60 inches; Burton—20 to 40 inches to hard bedrock
Other distinctive properties: Random areas of seeps and springs; water movement along bedrock contacts in the Burton soil

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in saddles and gaps
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Wayah soils that have fine sandy loam and sandy loam surface layers
- Burton soils that have coarse sandy loam, fine sandy loam, and loam surface layers
- Random areas of similar soils that have bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Pasture, recreation, and wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, bouldery surface, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Wayah—equipment use, erodibility, climate, pesticide retention, soil fertility, and rooting depth; Burton—equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- This map unit is limited for pasture and hayland because of the slope, erodibility, bouldery surface, damaging high winds, and short growing season.
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.

- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Burton soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of damaging high winds, a short growing season, the bouldery surface, and the depth to bedrock and droughtiness of the Burton soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of damaging high winds, a short growing season, the bouldery surface, and the depth to bedrock of the Burton soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, and corrosivity; Burton—slope, erodibility, climate, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures so that they conform to natural slopes helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Design modifications are needed to overcome prolonged freezing temperatures and damaging high winds.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of the Burton soil.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wayah—slope and climate; Burton—slope, climate, and depth to bedrock

Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Design modifications are needed to overcome prolonged freezing temperatures.
- Locating and using areas of the deeper Wayah soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, and frost action; Burton—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Blasting or special grading equipment is needed to construct roads on the Burton soil.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, pesticide retention, soil fertility, and depth to bedrock; Burton—slope, erodibility, climate, pesticide retention, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Due to a short growing season, the use of native, winter-hardy landscape plants is recommended.
- This map unit is subject to damaging high winds and may be unsuitable for some types of landscaping.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Burton soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Groups

Land capability classification: 4s

WrD—Wayah-Burton complex, windswept, 15 to 30 percent slopes, bouldery

Setting

Landscape: High mountains in the northeast, near Craggy Gardens, and in the southwest, near Mt. Pisgah
Elevation range: 4,700 to 6,200 feet
Landform: Ridges
Landform position: Summits and upper side slopes
Shape of areas: Long and narrow or irregular
Size of areas: Up to 72 acres

Composition

Wayah soil and similar inclusions: 50 percent
Burton soil and similar inclusions: 40 percent
Dissimilar inclusions: 10 percent

Typical Profile

Wayah

Surface layer:
0 to 14 inches—very dark brown loam

Subsoil:
14 to 48 inches—yellowish brown sandy loam

Underlying material:
48 to 80 inches—brown gravelly sandy loam saprolite

Burton

Surface layer:
0 to 17 inches—very dark brown sandy clay loam

Subsoil:
17 to 29 inches—dark yellowish brown sandy loam

Bedrock:
29 to 80 inches—unweathered hard metagraywacke

Soil Properties and Qualities

Depth class: Wayah—very deep; Burton—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Wayah—moderate; Burton—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart

Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Wayah—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the lower horizons; Burton—extremely acid to moderately acid throughout the profile
Parent material: Residuum weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Wayah—more than 60 inches; Burton—20 to 40 inches to hard bedrock
Other distinctive properties: Random areas of seeps and springs; water movement along bedrock contacts in the Burton soil

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains and in saddles and gaps
- Random areas of soils on less than 15 percent or greater than 30 percent slopes

Similar inclusions:
- Wayah soils that have fine sandy loam and sandy loam surface layers
- Burton soils that have coarse sandy loam, fine sandy loam, and loam surface layers
- Random areas of similar soils that have bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Wildlife habitat and recreation
Other Uses: Pasture

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, bouldery surface, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited
Management concerns: Wayah—equipment use, erodibility, climate, pesticide retention, soil fertility, and rooting depth; Burton—equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- This map unit is limited for pasture and hayland because of the slope, erodibility, bouldery surface, damaging high winds, and short growing season.
- The slope limits equipment use in the steeper areas.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.

- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Burton soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of damaging high winds, a short growing season, the bouldery surface, and the depth to bedrock and droughtiness of the Burton soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of damaging high winds, a short growing season, low productivity, the bouldery surface, and the depth to bedrock of the Burton soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, and corrosivity; Burton—slope, erodibility, climate, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Design modifications are needed to overcome prolonged freezing temperatures.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of the Burton soil.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wayah—slope, climate, and prolonged freezing temperatures; Burton—slope, climate, prolonged freezing temperatures, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.

- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Design modifications are needed to overcome prolonged freezing temperatures.
- Locating and using areas of the deeper Wayah soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, and frost action; Burton—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Blasting or special grading equipment is needed to construct roads on the Burton soil.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, pesticide retention, soil fertility, and depth to bedrock; Burton—slope, erodibility, climate, pesticide retention, soil fertility, depth to bedrock, and droughtiness
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Due to a short growing season, the use of native, winter-hardy landscape plants is recommended.
- This map unit is subject to damaging high winds and may be unsuitable for some types of landscaping.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Burton soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Groups

Land capability classification: 6s

WrE—Wayah-Burton complex, windswept, 30 to 50 percent slopes, bouldery

Setting

Landscape: High mountains in the northeast, near Craggy Gardens, and in the southwest, near Mt. Pisgah
Elevation range: 4,700 to 6,200 feet
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Shape of areas: Irregular
Size of areas: Up to 59 acres

Composition

Wayah soil and similar inclusions: 45 percent
Burton soil and similar inclusions: 40 percent
Dissimilar inclusions: 15 percent

Typical Profile

Wayah

Surface layer:
0 to 14 inches—very dark brown loam

Subsoil:
14 to 48 inches—yellowish brown sandy loam

Underlying material:
48 to 80 inches—brown gravelly sandy loam saprolite

Burton

Surface layer:
0 to 17 inches—very dark brown sandy clay loam

Subsoil:
17 to 29 inches—dark yellowish brown sandy loam

Bedrock:
29 to 80 inches—unweathered hard metagraywacke

Soil Properties and Qualities

Depth class: Wayah—very deep; Burton—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Wayah—moderate; Burton—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Steep
Soil slippage potential: Low
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: Widely scattered surface stones and boulders that average about 10 to 48 inches in diameter and 25 to 75 feet apart

Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Wayah—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the lower horizons; Burton—extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Wayah—more than 60 inches; Burton—20 to 40 inches to hard bedrock
Other distinctive properties: Random areas of seeps and springs; potential for downslope movement when lateral support is removed; water movement along bedrock contacts in the Burton soil

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Widely scattered areas of rock outcrop
- Soils that have more rock fragments in the subsoil; below rock outcrops and in drainageways
- Soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, in drainageways, and on benches and footslopes
- Random areas of soils on less than 30 percent or greater than 50 percent slopes

Similar inclusions:
- Wayah soils that have fine sandy loam and sandy loam surface layers
- Burton soils that have coarse sandy loam, fine sandy loam, and loam surface layers
- Random areas of similar soils that have bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Wildlife habitat and recreation

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, bouldery surface, and short growing season. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Management concerns: Wayah—equipment use, erodibility, climate, pesticide retention, soil fertility, and rooting depth; Burton—equipment use, erodibility, climate, pesticide retention, soil fertility, rooting depth, and droughtiness
Management measures and considerations:
- This map unit is severely limited for pasture and hayland because of the slope, erodibility, bouldery surface, damaging high winds, and short growing season.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- These soils may retain soil-applied herbicides and other pesticides due to the high

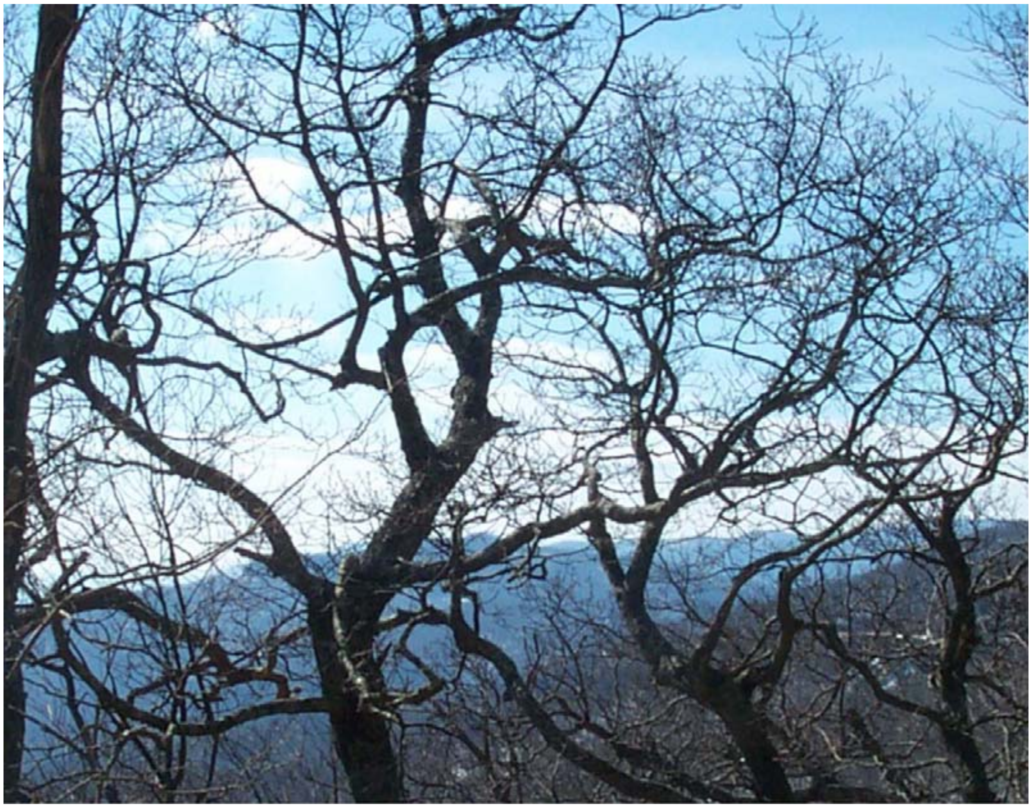


Figure 19.—Windswept hardwood trees are twisted, stunted, and gnarled by prolonged exposure to high winds and frequent ice storms. These conditions are common on high mountains and prominent ridgetops.

content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.

- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- Because of the low available water capacity due to the moderately deep rooting depth, the Burton soil is difficult to manage for the production of pasture and hay crops.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:

- This map unit is severely limited for orchard and ornamental crops because of the slope, erodibility, damaging high winds, short growing season, the bouldery surface, and the depth to bedrock and droughtiness of the Burton soil. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited (fig. 19)

Management concerns:
- This map unit is severely limited for timber production because of damaging high winds, a short growing season, low productivity, the bouldery surface, and the depth to bedrock of the Burton soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, and corrosivity; Burton—slope, erodibility, climate, corrosivity, and depth to bedrock
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Design modifications are needed to overcome prolonged freezing temperatures and high winds.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Drilling and blasting of rock or special earthmoving equipment is needed to increase the depth of the Burton soil.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wayah—slope, climate, and prolonged freezing temperatures; Burton—slope, climate, prolonged freezing temperatures, and depth to bedrock
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.
- Design modifications are needed to overcome prolonged freezing temperatures.
- Locating and using areas of the deeper Wayah soil may improve the performance of filter fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, and frost action; Burton—slope, erodibility, frost action, and depth to bedrock
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Permanent surfacing of roads or using suitable subgrade or base material allows for year-round use and helps to reduce the damage from frost heaving.
- Blasting or special grading equipment is needed to construct roads on the Burton soil.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Wayah—slope, erodibility, climate, pesticide retention, soil

fertility, and depth to bedrock; Burton—slope, erodibility, climate, pesticide retention, soil fertility, depth to bedrock, and droughtiness

Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Due to a short growing season, the use of native, winter-hardy landscape plants is recommended.
- This map unit is subject to damaging high winds and may be unsuitable for some types of landscaping.
- These soils may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Because of the moderately deep rooting depth, the Burton soil is difficult to manage for lawns and landscaping, especially if the soil has been disturbed.

Interpretive Groups

Land capability classification: 7s

WsF—Wayah-Burton complex, windswept, 50 to 95 percent slopes, very rocky

Setting

Landscape: High mountains in the northeast, near Craggy Gardens, and in the southwest, near Mt. Pisgah
Elevation range: 4,700 to 6,200 feet
Landform: Mountain slopes
Landform position: Side slopes
Shape of areas: Irregular
Size of areas: Up to 90 acres

Composition

Wayah soil and similar inclusions: 50 percent
Burton soil and similar inclusions: 30 percent
Dissimilar inclusions: 20 percent

Typical Profile

Wayah

Surface layer:
0 to 14 inches—very dark brown loam

Subsoil:
14 to 48 inches—yellowish brown sandy loam

Underlying material:
48 to 80 inches—brown gravelly sandy loam saprolite

Burton

Surface layer:
0 to 17 inches—very dark brown sandy clay loam

Subsoil:
17 to 29 inches—dark yellowish brown sandy loam

Bedrock:
29 to 80 inches—unweathered hard metagraywacke

Soil Properties and Qualities

Depth class: Wayah—very deep; Burton—moderately deep
Drainage class: Well drained
General texture class: Loamy
Permeability: Moderately rapid
Available water capacity: Wayah—moderate; Burton—very low
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Very steep
Soil slippage potential: Medium
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Very severe
Rock fragments on the surface: About 3 percent surface cobbles and stones that average about 3 to 24 inches in diameter and 3 to 25 feet apart
Extent of rock outcrop: About 10 percent on the soil surface
Organic matter content of surface layer: Very high
Potential frost action: Moderate
Special climatic conditions: Soils subject to prolonged freezing temperatures and rime ice in winter, high winds, high rainfall, and a short growing season
Soil reaction: Wayah—extremely acid to strongly acid in the A horizon and extremely acid to moderately acid in the lower horizons; Burton—extremely acid to moderately acid throughout the profile
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: Wayah—more than 60 inches; Burton—20 to 40 inches to hard bedrock
Other distinctive properties: Soils subject to downslope movement when lateral support is removed and to differential settling when used as fill material; water movement along bedrock contacts in the Burton soil

Minor Components

Dissimilar inclusions:
- Soils that have hard bedrock at a depth of 10 to 20 inches; adjacent to rock outcrops
- Soils that have more rock fragments in the subsoil; below rock outcrops and in drainageways
- Soils that have loamy subsoils and have bedrock at a depth of more than 60 inches; in concave areas at the head of drains, in drainageways, and on benches and footslopes
- Random areas of soils on less than 50 percent or greater than 95 percent slopes

Similar inclusions:
- Wayah soils that have fine sandy loam and sandy loam surface layers
- Burton soils that have coarse sandy loam, fine sandy loam, and loam surface layers
- Random areas of similar soils that have bedrock at a depth of 40 to 60 inches

Land Use

Dominant Uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for crop production because of the slope, erodibility, damaging high winds, short growing season, and extent of rock outcrops. A site should be selected on better suited soils.

Pasture and hayland

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for the production of pasture and hay crops because of the slope, erodibility, damaging high winds, short growing season, and extent of rock outcrops. A site should be selected on better suited soils.

Orchard and ornamental crops

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for orchard and ornamental crops because of the slope, damaging high winds, short growing season, erodibility, and extent of rock outcrops. A site should be selected on better suited soils.

Woodland Management and Productivity

Potential for commercial species: Very low
Suitability: Unsuited
Management concerns:
- This map unit is severely limited for timber production because of damaging high winds, a short growing season, low productivity, and depth to bedrock in the Burton soil. A site should be selected on better suited soils.

Urban Development

Dwellings

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for dwellings because of the slope, erodibility, damaging high winds, prolonged freezing temperatures, depth to bedrock in the Burton soil, and the extent of rock outcrops. A site should be selected on better suited soils.

Septic tank absorption fields

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for septic tank absorption fields because of the slope, prolonged freezing temperatures, depth to bedrock in the Burton soil, and the extent of rock outcrops. A site should be selected on better suited soils.

Local roads and streets

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for roads and streets because of the slope, erodibility, depth to bedrock in the Burton soil, and the extent of rock outcrops. A site should be selected on better suited soils.

Lawns and landscaping

Suitability: Unsuited
Management concerns:
- This map unit is severely limited for lawns and landscaping because of the slope, erodibility, damaging high winds, short growing season, depth to bedrock in the Burton soil, and the extent of rock outcrops. A site should be selected on better suited soils.

Interpretive Groups

Land capability classification: 7s

WtB—Whiteside loam, 2 to 8 percent slopes

Setting

Landscape: Mountain valleys scattered throughout the county
Elevation range: 2,400 to 3,200 feet
Landform: Colluvial fans
Landform position: Concave to planar toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 19 acres

Composition

Whiteside soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 14 inches—very dark grayish brown loam

Subsoil:
14 to 47 inches—grayish brown sandy clay loam that has mottles in shades of red and brown

Underlying material:
47 to 53 inches—light brownish gray sandy loam
53 to 80 inches—gray sandy clay loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Moderately well drained
General texture class: Loamy
Permeability: Moderate
Available water capacity: Moderate or high
Depth to seasonal high water table: 2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Hazard of flooding: None

Shrink-swell potential: Low
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral in the A horizon and very strongly acid to moderately acid in the B and C horizons
Parent material: Colluvium and old alluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and are 8 to 40 inches to strata with a high content of rock fragments; along stream channels
- Somewhat poorly drained French and poorly drained Nikwasi soils that have a subsoil that is loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; along stream channels, in depressions, and in backwater areas
- Soils that have surface layers with less organic matter; in cropped fields
- Very poorly drained Hemphill soils that have a clayey subsoil in depressions and backwater areas
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of well drained Tusquitee soils
- Random areas of soils on less than 2 percent or greater than 8 percent slopes

Similar inclusions:
- Whiteside soils that have sandy loam, fine sandy loam, and sandy clay loam surface layers

Land Use

Dominant Uses: Hayland, pasture, and cropland
Other Uses: Recreation and woodland

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, climate, tilth, pesticide retention, and soil fertility
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.

- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Erodibility, climate, wetness, root disease, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and very high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.

- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Erodibility, wetness, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for dwellings.
- This map unit is difficult to manage for dwellings due to a seasonal high water table at a depth of 2.0 to 3.0 feet.
- There is a moderate or high risk of corrosion damage to uncoated steel and concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wetness and restricted permeability
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for septic tank absorption fields.
- This map unit is difficult to manage for septic tank absorption fields due to a seasonal high water table at a depth of 2.0 to 3.0 feet.

Local roads and streets

Suitability: Poorly suited
Management concerns: Erodibility, seeps and springs, large stones, wetness, and low strength
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- When the soil is wet, unsurfaced roads are highly erodible and very slick due the content of silt and clay in the subsoil.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Large stones and boulders may be encountered during excavation.

Lawns and landscaping

Suitability: Suited

Management concerns: Erodibility, climate, root disease, soil fertility, wetness, and soil compaction

Management measures and considerations:

- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating disturbed areas and using erosion-control structures such as sediment fences helps to keep eroding soil on site.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.

Interpretive Groups

Land capability classification: 2w

WtC—Whiteside loam, 8 to 15 percent slopes

Setting

Landscape: Mountain valleys scattered throughout the county
Elevation range: 2,400 to 3,200 feet
Landform: Colluvial fans
Landform position: Concave to planar toeslopes
Shape of areas: Irregular or oblong
Size of areas: Up to 20 acres

Composition

Whiteside soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 14 inches—very dark grayish brown loam

Subsoil:
14 to 47 inches—grayish brown sandy clay loam that has mottles in shades of red and brown

Underlying material:
47 to 53 inches—light brownish gray sandy loam
53 to 80 inches—gray sandy clay loam

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Moderately well drained
General texture class: Loamy
Permeability: Moderate

Available water capacity: Moderate or high
Depth to seasonal high water table: 2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Hazard of flooding: None
Shrink-swell potential: Low
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: High or very high
Potential frost action: Moderate
Soil reaction: Very strongly acid to neutral in the A horizon and very strongly acid to moderately acid in the B and C horizons
Parent material: Colluvium and old alluvium derived from felsic or mafic high-grade metamorphic or igneous rock
Depth to bedrock: More than 60 inches
Other distinctive properties: Random areas of seeps and springs; soil subject to overland flow of storm water from adjacent uplands

Minor Components

Dissimilar inclusions:
- Moderately well drained Dellwood and Reddies soils that are loamy in the upper part and are 8 to 40 inches to strata with a high content of rock fragments; along stream channels
- Somewhat poorly drained French and poorly drained Nikwasi soils that have a subsoil that is loamy in the upper part and are 20 to 40 inches to strata with a high content of rock fragments; along stream channels, in depressions, and in backwater areas
- Soils that have surface layers with less organic matter; in cropped fields
- Very poorly drained Hemphill soils that have a clayey subsoil; in depressions and backwater areas
- Areas that rarely flood for very brief duration; along stream channels
- Random areas of well drained Tusquitee soils
- Random areas of soils on less than 8 percent or greater than 15 percent slopes

Similar inclusions:
- Whiteside soils that have sandy loam, fine sandy loam, and sandy clay loam surface layers

Land Use

Dominant Uses: Hayland, pasture, and cropland
Other Uses: Recreation and woodland

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, climate, tilth, pesticide retention, and soil fertility
Management measures and considerations:
- Using conservation practices, such as contour farming, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.

- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- The slope may limit the use of equipment in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.

Pasture and hayland

Suitability: Well suited
Management concerns: Erodibility, pesticide retention, and soil fertility
Management measures and considerations:
- Preparing seedbeds on the contour or across the slope helps to minimize soil erosion and increases germination.
- Growing adapted plants helps to ensure the production of high-quality forage and helps to minimize soil erosion.
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- This soil may retain soil-applied herbicides and other pesticides due to the high content of organic matter in the surface layer. The concentration of pesticides may be damaging to future crops.
- Using plant-applied pesticides rather than soil-applied ones may increase their effectiveness.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Using rotational grazing, implementing a well planned harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

Orchard and ornamental crops

Suitability: Poorly suited
Management concerns: Erodibility, climate, wetness, root disease, and soil fertility
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.

Woodland Management and Productivity

Potential for commercial species: Moderately high for cove hardwoods and very high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility and equipment use
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the slope, the high content of organic matter in the surface layer, and the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the surface layer and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Erodibility, wetness, and corrosivity
Management measures and considerations:
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for dwellings.
- This map unit is difficult to manage for dwellings due to a seasonal high water table at a depth of 2.0 to 3.0 feet.
- There is a moderate or high risk of corrosion damage to uncoated steel and concrete.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Wetness and restricted permeability
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- An onsite investigation is needed to determine the suitability and limitations of any area within this map unit for septic tank absorption fields.
- This map unit is difficult to manage for septic tank absorption fields due to a seasonal high water table at a depth of 2.0 to 3.0 feet.

Local roads and streets

Suitability: Poorly suited
Management concerns: Erodibility, seeps and springs, large stones, wetness, and low strength
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.

- When the soil is wet, unsurfaced roads are highly erodible and very slick due the content of silt and clay in the subsoil.
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Large stones and boulders may be encountered during excavation.

Lawns and landscaping

Suitability: Suited
Management concerns: Erodibility, climate, root disease, soil fertility, wetness, and soil compaction
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating disturbed areas and using erosion-control structures, such as sediment fences, helps to keep eroding soil on site.
- Slow air drainage and frost pockets may allow late spring frost to damage new growth in some years.
- In areas where water concentrates, such as drainageways, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.
- Due to the seasonal high water table, wetness, and restricted movement of air and water caused by the clay content of the subsoil, phytophthora root disease is a potential limitation affecting Fraser fir and other susceptible ornamentals.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.

Interpretive Groups

Land capability classification: 3e

ZcB—Zillicoa loam, 2 to 8 percent slopes

Setting

Landscape: Intermountain hills and low mountains of the Asheville Basin in the central part of the county
Elevation range: 1,900 to 2,400 feet
Landform: Ridges
Landform position: Summits
Shape of areas: Long and narrow to wide or irregular
Size of areas: Up to 5 acres

Composition

Zillicoa soil and similar inclusions: 85 percent
Dissimilar inclusions: 15 percent

Typical Profile

Surface layer:
0 to 4 inches—very dark grayish brown loam

Subsoil:
4 to 9 inches—dark yellowish brown loam

9 to 36 inches—dark yellowish brown clay
36 to 48 inches—dark yellowish brown sandy clay loam

Bedrock:
48 to 81 inches—weathered garnet hornblende fels

Soil Properties and Qualities

Depth class: Deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer, slow in the subsoil, and moderate in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate or high
Slope class: Gently sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid in the A and BA horizons, strongly acid to slightly alkaline in the Bt and Bss horizons, and strongly acid to slightly acid in the BC and C horizons; base saturation by sum of cations is 35 to 60 percent at 1.25 meters below the top of the argillic horizon
Parent material: Residuum weathered from ultra mafic high-grade metamorphic rock, such as coarse-grained garnet hornblende fels
Depth to bedrock: 40 to 60 inches to weathered bedrock
Other distinctive properties: Subsoil with a high clay content; Vertic feature—coefficient of linear extensibility (COLE) measured 7.2 cm in the upper meter of soil; shrink-swell properties are enhanced due to the high proportion of fine clay (80 percent of total clay is fine clay)

Minor Components

Dissimilar inclusions:
- Random areas of similar soils that have soft bedrock at a depth of at 20 to more than 60 inches
- Random areas of Cowee and Evard soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Walnut and Mars Hill soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil
- Random areas of Braddock and Unison soils that have less clay
- Random areas of Clifton and similar soils that have soft bedrock at a depth of 40 to more than 60 inches
- Random areas of soils on less than 2 or greater than 8 percent slopes
- Random areas of moderately or severely eroded soils where underlying material is exposed at the surface
- Soils which have low base saturation in the lower subsoil

Similar inclusions:
- Zillicoa soils that have loam, sandy loam, and fine sandy loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited
Management concerns: Erodibility, equipment use, tilth, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Using resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations which include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Pasture and hayland

Suitability: Well suited
Management concerns: Equipment use, erodibility, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Preparing seedbeds on the contour when renovating pastures and establishing seedbeds helps to prevent further soil erosion and increases germination.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.

- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Orchard and ornamental crops

Suitability: Well suited to orchards; poorly suited to ornamental crops
Management concerns: Erodibility, equipment use, root disease, soil fertility, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- The slope may limit the use of equipment in the steeper areas.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility, equipment use, seedling survival, and pesticide retention
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Using improved varieties of eastern white pine helps to increase productivity.

- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, corrosivity, and shrink-swell potential
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Random areas of soils that have soft bedrock at a depth of less than 40 inches should not be difficult to excavate but will be difficult to vegetate on cut and fill slopes.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Large stones may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Increasing the size of the septic tank absorption field helps to improve its performance.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Well suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.

- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the clay content, may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: 2e

ZcC—Zillicoa loam, 8 to 15 percent slopes

Setting

Landscape: Intermountain hills and low mountains of the Asheville Basin in the central part of the county
Elevation range: 1,900 to 2,400 feet
Landform: Ridges, hillslopes, and mountain slopes
Landform position: Summits and upper side slopes

Shape of areas: Long and narrow to wide or irregular
Size of areas: Up to 33 acres

Composition

Zillicoa soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 4 inches—very dark grayish brown loam

Subsoil:
4 to 9 inches—dark yellowish brown loam
9 to 36 inches—dark yellowish brown clay
36 to 48 inches—dark yellowish brown sandy clay loam

Bedrock:
48 to 81 inches—weathered garnet hornblende fels

Soil Properties and Qualities

Depth class: Deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer, slow in the subsoil, and moderate in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate or high
Slope class: Strongly sloping
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid in the A and BA horizons, strongly acid to slightly alkaline in the Bt and Bss horizons, and strongly acid to slightly acid in the BC and C horizons; base saturation by sum of cations is 35 to 60 percent at 1.25 meters below the top of the argillic horizon
Parent material: Residuum weathered from ultra mafic high-grade metamorphic rock, such as coarse-grained garnet hornblende fels
Depth to bedrock: 40 to 60 inches to weathered bedrock
Other distinctive properties: Subsoil with a high clay content; Vertic feature—coefficient of linear extensibility (COLE) measured 7.2 cm in the upper meter of soil; shrink-swell properties are enhanced due to the high proportion of fine clay (80 percent of total clay is fine clay)

Minor Components

Dissimilar inclusions:
- Random areas of similar soils that have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Cowee and Evard soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches

- Random areas of Walnut and Mars Hill soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil
- Random areas of Braddock and Unison soils that have less clay
- Random areas of Clifton and similar soils that have soft bedrock at a depth of 40 to more than 60 inches
- Random areas of soils on less than 8 and greater than 15 percent slopes
- Random areas of moderately eroded or severely eroded soils where underlying material is exposed at the surface
- Soils which have low base saturation in the lower subsoil

Similar inclusions:
- Zillicoa soils that have loam, sandy loam, and fine sandy loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral

Land Use

Dominant Uses: Cropland, pasture, and hayland
Other Uses: Building site development, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Suited
Management concerns: Erodibility, equipment use, tilth, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Using resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations which include grasses and legumes, helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- The slope may limit the use of equipment in the steeper areas.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Pasture and hayland

Suitability: Well suited
Management concerns: Equipment use, erodibility, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Preparing seedbeds on the contour when renovating pastures and establishing seedbeds helps to prevent further soil erosion and increases germination.

- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Orchard and ornamental crops

Suitability: Well suited to orchards; poorly suited to ornamental crops
Management concerns: Erodibility, equipment use, root disease, soil fertility, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- The slope may limit the use of equipment in the steeper areas.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Well suited
Management concerns: Erodibility, equipment use, seedling survival, and pesticide retention

Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Using improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, corrosivity, and shrink-swell potential,
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Random areas of soils that have soft bedrock at a depth of less than 40 inches should not be difficult to excavate but will be difficult to vegetate on cut and fill slopes.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Large stones may be encountered during excavation.

Septic tank absorption fields

Suitability: Suited
Management concerns: Restricted permeability, high clay content, and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.

- Increasing the size of the septic tank absorption field helps to improve its performance.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.

Lawns and landscaping

Suitability: Suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the clay content, may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.

- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: 3e

ZoD—Zillicoa loam, 15 to 30 percent slopes, stony

Setting

Landscape: Intermountain hills and low mountains of the Asheville Basin in the central part of the county
Elevation range: 1,900 to 2,400 feet
Landform: Ridges, hillslopes, and mountain slopes
Landform position: Side slopes
Shape of areas: Long and narrow to wide or irregular
Size of areas: Up to 101 acres

Composition

Zillicoa soil and similar inclusions: 80 percent
Dissimilar inclusions: 20 percent

Typical Profile

Surface layer:
0 to 4 inches—very dark grayish brown loam

Subsoil:
4 to 9 inches—dark yellowish brown loam
9 to 36 inches—dark yellowish brown clay
36 to 48 inches—dark yellowish brown sandy clay loam

Bedrock:
48 to 81 inches—weathered garnet hornblende fels

Soil Properties and Qualities

Depth class: Deep
Drainage class: Well drained
General texture class: Clayey
Permeability: Moderate in the surface layer, slow in the subsoil, and moderate in the underlying material
Available water capacity: High
Depth to seasonal high water table: More than 6.0 feet
Hazard of flooding: None
Shrink-swell potential: Moderate or high
Slope class: Moderately steep
Soil slippage potential: None
Extent of erosion: Slight, less than 25 percent of the original surface layer has been removed
Hazard of water erosion: Moderate
Rock fragments on the surface: Widely scattered surface cobbles and stones that average about 3 to 24 inches in diameter and 25 to 75 feet apart
Organic matter content of surface layer: Moderate or high
Potential frost action: Moderate
Soil reaction: Very strongly acid to moderately acid in the A and BA horizons, strongly

acid to slightly alkaline in the Bt and Bss horizons, and strongly acid to slightly acid in the BC and C horizons; base saturation by sum of cations is 35 to 60 percent at 1.25 meters below the top of the argillic horizon

Parent material: Residuum weathered from ultra mafic high-grade metamorphic rock, such as coarse-grained garnet hornblende fels

Depth to bedrock: 40 to 60 inches to weathered bedrock

Other distinctive properties: Subsoil with a high clay content; Vertic feature—coefficient of linear extensibility (COLE) measured 7.2 cm in the upper meter of soil; shrink-swell properties are enhanced due to the high proportion of fine clay (80 percent of total clay is fine clay)

Minor Components

Dissimilar inclusions:

- Random areas of similar soils that have soft bedrock at a depth of at 20 to more than 60 inches
- Random areas of Cowee and Evard soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to more than 60 inches
- Random areas of Walnut and Mars Hill soils that have less clay in the subsoil and have soft bedrock at a depth of 20 to 60 inches
- Random areas of Fannin soils that have less clay and more mica in the subsoil
- Random areas of Braddock and Unison soils that have less clay
- Random areas of Clifton and similar soils that have soft bedrock at a depth of 40 to more than 60 inches
- Random areas of soils on less than 15 and greater than 30 percent slopes
- Random areas of moderately eroded or severely eroded soils where underlying material is exposed at the surface
- Soils which have low base saturation in the lower subsoil

Similar inclusions:

- Zillicoa soils that have loam, sandy loam, and fine sandy loam surface layers
- Random areas that have reaction in the lower subsoil that ranges to neutral

Land Use

Dominant Uses: Pasture, hayland, and cropland
Other Uses: Building site development, woodland, and wildlife habitat

Agricultural Development

Cropland

Suitability: Poorly suited

Management concerns: Erodibility, equipment use, tilth, root penetration, soil fertility, and pesticide retention

Management measures and considerations:

- This soil is difficult to manage for cultivated crops because the slope limits equipment use.
- Using resource management systems that include contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations which include grasses and legumes helps to minimize soil erosion, maximize rainfall infiltration, increase the available water capacity, and improve soil fertility.
- Avoiding tillage during wet periods, incorporating crop residue into the soil, or leaving residue on the soil surface helps to minimize clodding and crusting and increases rainfall infiltration.
- Chisel plowing and subsoiling help to break through clay pans and allow increased root penetration and rainfall infiltration.

- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes crop productivity.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Pasture and hayland

Suitability: Suited
Management concerns: Equipment use, erodibility, root penetration, soil fertility, and pesticide retention
Management measures and considerations:
- Preparing seedbeds on the contour when renovating pastures and establishing seedbeds helps to prevent further soil erosion and increases germination.
- Using perennial grasses and legumes in rotation helps to penetrate and break up the clayey root zone.
- Fencing livestock from creeks and streams helps to prevent streambank erosion and sedimentation.
- The slope may limit the use of equipment in the steeper areas when harvesting hay crops.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Using rotational grazing, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increase productivity.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.

Orchard and ornamental crops

Suitability: Suited to orchards; poorly suited to ornamental crops
Management concerns: Erodibility, equipment use, root disease, soil fertility, pesticide retention, and ball and burlap harvesting
Management measures and considerations:
- Establishing and maintaining sod between rows and on access roads helps to reduce the hazard of erosion.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- The slope may limit the use of equipment in the steeper areas.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- Following lime and fertilizer recommendations from soil tests helps to increase the availability of plant nutrients and maximize productivity.

- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to future crops.
- Plant-applied pesticides may be more effective than soil-applied pesticides, which are tied up by the high clay content.
- Avoiding ball and burlap harvesting during extreme moisture conditions helps to prevent the fracture or deformation of the ball and the tearing of plant roots.

Woodland Management and Productivity

Potential for commercial species: Moderate for upland hardwoods and high for eastern white pine
Suitability: Suited
Management concerns: Erodibility, equipment use, seedling survival, and pesticide retention
Management measures and considerations:
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes helps to stabilize logging roads, skid trails, and landings.
- Reseeding all disturbed areas with adapted grasses and legumes helps to prevent soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- When the soil is wet, skid trails and unsurfaced roads are highly erodible and very slick due to the clay content of the subsoil.
- Avoiding logging operations during periods when the soil is saturated helps to prevent rutting of the soil surface and damage to tree roots due to soil compaction.
- Leaving a buffer zone of trees and shrubs adjacent to streams helps to reduce siltation and provides shade for the aquatic habitat.
- Livestock should not graze in areas managed for woodland.
- Using improved varieties of eastern white pine helps to increase productivity.
- Replanting may be necessary on warm, south- to west-facing slopes because of reduced soil moisture. Planting when the soil is moist for extended periods helps to increase seedling survival rates.
- Soil-applied herbicides are retained due to herbicide-clay bonding, which may damage tree seedlings when cropland is converted to woodland.

Urban Development

Dwellings

Suitability: Poorly suited
Management concerns: Slope, erodibility, high clay content, corrosivity, large stones, and shrink-swell potential
Management measures and considerations:
- Designing structures on the contour with natural slopes or building in the less sloping areas helps to improve soil performance.
- Vegetating cleared and graded areas as soon as possible and using erosion-control structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Reinforcing foundations and footings or backfilling with coarse textured material

helps to strengthen buildings and prevents damage caused by shrinking and swelling.
- Using corrosion-resistant materials helps to reduce the risk of damage to uncoated steel and concrete.
- Random areas of soils that have soft bedrock at a depth of less than 40 inches should not be difficult to excavate but will be difficult to vegetate on cut and fill slopes.
- Installing a subsurface drainage system around foundations helps to intercept water from seeps and springs.
- Large stones may be encountered during excavation.

Septic tank absorption fields

Suitability: Poorly suited
Management concerns: Restricted permeability, high clay content, and slope
Management measures and considerations:
- The local Health Department should be contacted for guidance on sanitary facilities.
- Increasing the size of the septic tank absorption field helps to improve its performance.
- Avoiding the installation of septic system distribution lines during wet periods helps to reduce the smearing and sealing of trench walls.
- Raking trench walls helps to reduce the sealing of soil pores which may occur during the excavation of septic tank absorption fields.
- Installing distribution lines on the contour helps to improve the performance of septic tank absorption fields.

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength, high clay content, slope, erodibility, and frost action
Management measures and considerations:
- Incorporating sand and gravel into the soil, compacting roadbeds, and designing roads that conform to natural slopes help to improve soil strength.
- Using a nondegradeable, permeable fabric filter cloth between the roadbed and the soil surface helps to restrict the loss of stone into the soil.
- This soil is slippery and sticky when wet and slow to dry.
- Designing roads on the contour and installing water-control structures, such as broad-base dips, water bars, and culverts, help to maintain road stability.
- Avoiding the diversion of water directly onto fill slopes and vegetating cut and fill slopes as soon as possible help to prevent slippage and excessive soil erosion.
- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- Permanent surfacing of roads or using suitable subgrade or base material increases strength, allows for year-round use, and helps to reduce the damage from frost heaving.
- Random areas of soils that have soft bedrock at a depth of less than 40 inches should not be difficult to excavate but will be difficult to vegetate on cut and fill slopes.

Lawns and landscaping

Suitability: Poorly suited
Management concerns: Slope, erodibility, high clay content, soil compaction, root disease, pesticide retention, and soil fertility
Management measures and considerations:
- Designing plantings on natural contours helps to increase water infiltration.
- Vegetating cleared and graded areas as soon as possible and using erosion-control

structures, such as silt fences and catch basins, help to maintain soil stability and prevent sediments from leaving the site.

- Because of the high content of clay, revegetating cut and fill slopes is difficult.
- This soil is slippery and sticky when wet and slow to dry.
- Avoiding the use of heavy equipment in areas to be landscaped helps to prevent soil compaction.
- Due to the restricted movement of air and water caused by the high clay content of the subsoil, phytophthora root disease is a severe limitation affecting Fraser fir and other susceptible ornamentals.
- In areas where water concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other ornamentals are susceptible to phytophthora root disease. These areas should be avoided.
- This soil may retain soil-applied herbicides and other pesticides due to the high clay content. The concentration of pesticides may be damaging to landscape plants.
- Using plant-applied pesticides rather than soil-applied pesticides, which are tied up by the clay content, may increase their effectiveness.
- Using lime, fertilizer, mulch, and irrigation helps to establish lawns and landscape plants.
- Applying large granules or banding of phosphorus helps to overcome phosphorus fixation.
- Topsoil should be stockpiled from disturbed areas and replaced before landscaping.

Interpretive Groups

Land capability classification: 4e

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Generally, the soils in Buncombe County that are well suited to crops are also well suited to urban uses. The data concerning specific soils in the county can be used in planning future land use patterns. The potential for farming should be considered relative to any soil limitations and the potential for non-farm development.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited, slightly limited, somewhat limited,* and *very limited*. The suitability ratings are expressed as *well suited, moderately well suited, poorly suited,* and *unsuited* or as *good, fair,* and *poor*.

Figure 20.—Burley tobacco in an area of Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded, produces high crop yields when properly managed.

Crops and Pasture

Loring McIntyre, District Conservationist, Natural Resources Conservation Service; Gary Higgins, Department Director, Buncombe Soil and Water Conservation District; Kenneth Reeves, Buncombe County Extension Director, North Carolina Cooperative Extension Service; and Bobby Brock, Agronomist, and Kelley Jo Driggins, Grassland Management Specialist, Natural Resources Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified, the system of land capability classification used by the Natural Resources Conservation Service is explained, the estimated yields of the main crops and hay and pasture plants are listed for each soil, orchard and ornamental crops are discussed, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading “Detailed Soil Map Units” and in the tables. Specific information can be obtained from the local office of the Natural Resources Conservation Service, the Cooperative Extension Service, or the Buncombe Soil and Water Conservation District.

Federal and State regulations require that any area designated as wetlands cannot be altered without prior approval. Contact the local office of the Natural Resources Conservation Service for identification of hydric soils and potential wetlands.

Cropland

In 2002, according to the U.S. Census of Agriculture and the North Carolina Cooperative Extension Service of Buncombe County, the county had approximately 17,522 acres of cropland.

The major crops grown in Buncombe County include burley tobacco (fig. 20), silage corn, vegetables, landscaping ornamentals, berries, and apples. Cultivated lands occur on nearly level bottomland soils and gently sloping to strongly sloping terrace

soils along the major tributaries of the French Broad, Swannanoa, and Broad Rivers. Soils managed include Rosman, Biltmore, Iotla, French, Dellwood, Reddies, Statler, Dillard, Braddock, Kanuga, Swannanoa, Braddock, and Unison. Gently sloping to strongly sloping soils on intermountain hills and low mountains (such as Evard, Clifton, Fannin, Lauada, and Cowee soils) and on terraces and in coves (such as Unison and Tate soils) are farmed in the Leicester, Barnardsville, Sandymush, Newfound, and Avery Creek communities. Other areas of cultivated land are scattered throughout the county.

Ornamental crops are grown throughout the county on intermediate mountains, low mountains, and intermountain hills (Porters, Evard, and Edneyville soils), in coves and on terraces (Tate, Unison, and Tusquitee soils), and on flood plains (Rosman, French, Dellwood, and Reddies soils). Mountain and cove soils of valleys in the central and southern portions of the county are the major areas for growing ornamental crops.

The following paragraphs discuss several points relative to soil quality. Improving soil quality can help to reduce the onsite and offsite cost of soil erosion, improve nutrient utilization, and ensure that the soil resource is sustained for future use. The soil's physical, chemical, and biological properties must be at optimal levels for high yields to be maintained on a sustainable basis. More specific information can be obtained from the Natural Resources Conservation Service, the Buncombe Soil and Water Conservation District, and the North Carolina Cooperative Extension Service.

Erosion control.—Water erosion is a major concern on most of the soils used for cropland in Buncombe County. It is a hazard on soils that have a slope of more than 2 percent. Tate and Clifton soils are examples. As the slope length and percentage increases, the hazard of erosion and the difficulty in controlling erosion also increase. Loss of the surface layer through erosion is damaging. Soil productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Clifton and Braddock soils, and on soils that have a layer in or below the subsoil that limits the depth of the root zone, such as Cowee soils.

Erosion on farmland reduces soil productivity while the runoff pollutes streams, lakes, and reservoirs with sediment, agricultural chemicals, and nutrients. Controlling erosion improves the quality of water for municipal use, for recreation, and for fish and wildlife. Buncombe County's trout streams are especially sensitive to damage caused by runoff and sediment.

Erosion-control practices provide a protective surface cover, minimize runoff, and increase the rate of water infiltration. A cropping system that keeps a vegetative cover on the soil for extended periods helps to minimize soil loss and maintains the productive capacity of the soil. In sloping areas, including forage crops of grasses and legumes in the cropping system helps to control erosion. The forage crops also add nitrogen to the soil and improve tilth. Minimizing tillage and leaving crop residue on the surface increase the rate of water infiltration, minimize runoff, and help to control erosion. These practices can be effective on most of the soils in the survey area.

Other practices may include terraces or diversions which shorten the length of slopes and thus minimize erosion caused by runoff. Contour farming and stripcropping are also effective components of a resource management system. Stripcropping offers the use of crop rotation, crop residue management, contouring, conservation tillage, and cover crops. These methods are practical as they can be adapted to a wide range of slope patterns. Information about erosion-control measures for each kind of soil is available at the local office of the Natural Resources Conservation Service.

Water management.—Soils on bottom lands and low terraces are subject to flooding in varying frequencies and duration. Nikwasi and Toxaway soils are flooded frequently (the chance of flooding is greater than 50 percent in any year). Iotla, French, Rosman, Reddies, and Dellwood soils are flooded occasionally (the chance of flooding is 5 to 50 percent in any year). Dillard, Statler, and Hemphill soils are rarely

Figure 21.—Tomatoes in an area of Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded. Flooding damages crops, strips away valuable topsoil, and reduces the potential productivity of the soil.

flooded (the chance of flooding is 0 to 5 percent in any year). Although the duration of flooding is very brief, lasting less than 2 days, the risk of crop loss due to flooding during the growing season is always a possibility on these soils.

All flood plain soils have a flooding hazard to some degree. Flooding can result from runoff from adjacent slopes or from streambank overflow. Excessive surface water due to floods can delay equipment use and damage crops and forages (fig. 21). Tillage patterns can increase the problem by creating low areas and blocking surface water outlets. Some soils, such as Rosman and Iotla soils, flood occasionally but are commonly used for crops. Harvesting crops as soon as possible prevents the risk of damage from flooding. Diversions, land smoothing, and waterways are effective in removing the surface water runoff from adjacent slopes.

French soils are on bottomlands and may require artificial drainage. Subsurface drainage tile is used to control the water table in these soils. Wet areas due to seeps and springs occur in Dillard, Unison, Tate, Toecane, Tusquitee, Northcove, Maymead, and Whiteside soils. These soils are commonly identified on the soil map by a “wet spot” symbol. Subsurface drainage tile and surface ditching are methods used to control water in these soils. Nikwasi and Toxaway soils are very poorly drained and are not recommended for cropland use.

Surface water management is important on cropland. Overland flow and runoff from adjacent land onto cultivated lands must be controlled. Surface water movement across plowed fields needs control as well. Grassed waterways and diversions are examples of measures that help to reduce surface water problems, such as soil erosion, and help to maintain water quality in adjacent waterways. Onsite investigations are essential to determine the proper method of control.

Federal and State regulations require that any area designated as wetlands cannot be altered without prior approval. Contact the local office of the Natural Resources Conservation Service for identification of hydric soils and potential wetlands.

Soil tilth.—Soils with good tilth have good aeration, high water infiltration, good

water-holding capacity, and low seedling mortality. Soil properties associated with good tilth are loamy surface textures and a moderate to high content of organic matter content in the surface layer. Soils in Buncombe County on slopes of less than 3 percent commonly have better tilth than soils on slopes of more than 4 percent. Steeper areas are more susceptible to erosion. Erosion results in surface layers with higher clay contents, thus degrading tilth and overall soil quality.

Continuous cropping, a lack of erosion control, excessive cultivation, and surface compaction by farm equipment result in the depletion of organic matter, which adversely affects soil tilth. Periods of heavy rainfall result in the formation of a crust on the soil surface. The crust is hard when dry and nearly impervious to water. It reduces the rate of water infiltration and increases the runoff rate. Regular additions of crop residue, manure, and other organic material can improve soil structure and prevent the formation of a crust.

Resource management systems, such as contour farming, conservation tillage, crop residue management, stripcropping, winter cover crops, and crop rotations which include grasses and legumes, help to reduce soil erosion, clodding, and crusting. These practices also allow for increased rainfall infiltration, increased amounts of available water for plants, improved soil fertility, and soil tilth.

Because of crusting during winter and spring, fall plowing is generally not recommended. Many of the soils that are plowed in fall are almost as dense and hard at planting time as they were before they were plowed. More than 90 percent of the cropland in the survey area consists of sloping soils that are subject to erosion if plowed in the fall. Severely eroded, clayey soils, such as Clifton and Braddock, become cloddy if plowed outside a narrow range in moisture content. Fall plowing on these clayey soils generally results in better tilth in spring.

Some soils in the survey area have poor tilth because of gravel in the surface layer. These soils are in small, isolated areas along river bottoms and terraces. The content and size of the pebbles affect the use of tillage implements. Stones and boulders are common in many of the colluvial soils in the survey area, especially Tusquitee, Toecane, and Maymead soils. In some places the rock fragments prevent tillage. In other places they can be removed.

Soil fertility.—The soils in Buncombe County are generally low in natural fertility, and most are naturally acidic. Soils such as Mars Hill, Walnut, and Oteen are the exceptions. These soils have a pH that ranges from 5.1 to 7.3 (strongly acid to neutral). Soil amendments of lime, fertilizer, and organic matter are needed for most kinds of crop and pasture plants.

Liming requirements are a major concern because the acidity level in the soil affects the availability of many plant nutrients, the activity of beneficial bacteria, and the other components of the soil's biological community. Lime also neutralizes exchangeable aluminum. This counteracts the adverse effects of high levels of aluminum on many crops. Liming adds calcium (calcitic lime) or calcium and magnesium (dolomitic lime) to the soil. Incorporating lime into the soil before planting is important because lime moves slowly into the root zone when applied to the surface.

A soil test is used as a guide to indicate how much and what kind of lime and fertilizer should be used. For example, in soils that have sandy surface layers, magnesium and available calcium levels may be low. Depending on the soil properties and the crop to be grown, the desired pH levels may differ. Soil tests are needed to determine proper application rates.

Soil tests also determine the need for phosphorus and potassium fertilizer. These tests are important because, while natural occurring phosphorus and potassium levels are often very low, land in long-term agricultural use often has higher than expected levels of these nutrients. Phosphorous and potassium have a tendency to build up in the soil.

Nitrogen fertilizer is required for most crops. It is not, however, required for clover, in some rotations of soybeans, or for alfalfa that is established. Appropriate rates depend on the crop and the potential productivity of the soil. For example, nitrogen rates for corn on soils that have a yield potential of 180 to 200 bushels per acre should be about 160 to 180 pounds per acre. Where the yield potential is only 100 bushels per acre, rates of about 100 to 120 pounds of nitrogen per acre should be used. Application of nitrogen in excess of potential yields is not a recommended practice. The excess fertilizer not utilized by the crop creates an unnecessary expense and can result in the pollution of surface water and ground water.

Nitrogen can be readily leached from the more sandy soils, such as Biltmore, Rosman, Reddies, and Dellwood. As a result, split applications of nitrogen may be needed on these soils during the growing season.

Nitrogen rates can be reduced on fields using a continuous no-till system provided that levels of organic matter have been increased substantially. This increase may be achieved with a minimum of 2 tons per acre of organic matter left on the surface annually in the absence of tillage. Farmer experience and research alike have shown sustained yields with reduced nitrogen rates.

Pest control.—Herbicides and other pesticides may be necessary for controlling weeds, harmful insects, and disease. They should be applied by banding or spot treatment where possible. Following label directions ensures that target organisms are controlled and that the contamination of soil, water, air, and nontarget organisms is minimized. Soil properties, such as organic matter content and clay content of the surface layer, affect the rate of soil-applied treatments. Estimates for these properties were determined for the soils in this survey area. The thickness and texture of the soil layers is shown in the USDA texture column in **table 15**. **Table 16** shows the general range of clay content and of organic matter content in the surface layer.

In some areas, the organic matter content of a soil may be outside the range shown in **table 16**. The content may be higher in soils that have received high amounts of animal or manmade waste. Soils that have recently been brought into cultivation (through pasture conversion) may have a higher organic matter content in the surface layer than similar soils that have been cultivated (through cropland conversion). Lower levels of organic matter are common in soils where the surface layer has been partly or completely removed by erosion, land smoothing, or other activities, such as woodland clearing.

Soils such as Porters, Hemphill, Tusquitee, Whiteside, Dellwood, Reddies, and Rosman have enough organic matter in the surface layer to inhibit the activity of some soil-applied pesticides. Current soil tests should be used to measure the organic matter (humic) content before soil-applied rates are determined. Refer to the label of the pesticide container for further instructions. Eroded soils, such as Clifton, Fannin, and Braddock, may have enough clay in the surface layer to bind pesticides.

The wet conditions of soils, such as Nikwasi, Toxaway, and French, and areas with seeps and springs may reduce the effectiveness of pesticides and allow the contamination of surface water and ground water. Saturated soils and areas with excess surface water from prolonged rains or irrigation can carry herbicides and other pesticides to surface waters. The contamination of surface water and ground water is also a concern for Biltmore, Iotla, Rosman, Dellwood, and Reddies soils due to a high leaching rate caused by a low clay content. **Table 18** shows depth to water table and flooding frequency for soils in the survey area.

Erosion-control practices, such as permanent ground cover and grassed filter strips in drainageways and field borders, help to minimize soil loss and runoff that can carry absorbed or dissolved herbicides and other pesticides to surface waters. Utilizing weather forecasts and scheduling irrigation so that it does not conflict with herbicide and pesticide use help to reduce contamination problems.

The pesticide product labels show specific application rates based on the organic

matter and clay contents of the soil. Please refer to the “Detailed Soil Map Units” section for information on map unit composition, soil properties and behavior, and management concerns and considerations.

Using integrated pest management programs helps to avoid unnecessary pesticide applications. Crops are scouted to determine if pests are present and then monitored to determine when populations require control in order to prevent economic loss. This allows for the most timely, and thus the most cost-effective, use of the pesticide.

Other methods of weed, pest, and disease control include the use of goats, biological agents, mulching, hand weeding, and mowing. These viable alternatives can be used alone or in combination with chemical control. The latest information on these types of control can be obtained from the local office of the North Carolina Cooperative Extension Service, the Buncombe Soil and Water Conservation District, or the Natural Resources Conservation Service.

Soil biological improvements.—The “soil food web,” or biological community, is the living component of soil. Soil is a living system. Optimum soil quality and productivity cannot be achieved unless the soil supports a diverse, strongly active biological community. A single handful of healthy soil contains more individual microbes, bacteria, fungi, protozoa, beneficial nematodes, micro-arthropods, and larger animals, such as earthworms, than there are people on earth. These soil organisms support plant health as they decompose organic matter, cycle nutrients, and control soil organisms considered crop pests. They also decompose or fix pesticides and nutrients that might otherwise enter water and become pollutants. Many organisms enhance soil aggregation and porosity (soil structure), thus increasing infiltration and reducing runoff rates.

Organic matter is the key to the biological health of soil. It serves as the food source for the numerous types of beneficial soil organisms. Biological improvements require additions of organic matter, reduction in tillage, and more careful selection and application of fertilizers and pesticides. These improvements will in turn support a growing population of soil organisms that steadily enhance the soil’s physical and chemical properties and support plant health. As a result, agricultural productivity and air and water quality are improved.

Pasture and Hayland

In 2002, according to the U.S. Census of Agriculture and the North Carolina Cooperative Extension Service of Buncombe County, the county had approximately 23,175 acres of pasture and 15,500 acres of hayland.

A successful livestock enterprise depends on a forage program that provides large quantities of good-quality feed. In most areas of pasture and hayland in Buncombe County, renovation, brush control, and measures that prevent overgrazing are needed. The soils in the survey area vary widely in their ability to produce grasses and legumes because of differences in such properties as depth to bedrock or sand and gravel strata, internal drainage, and available water-holding capacity. Great differences in soil properties can occur within short distances and often within the same field (fig. 22). For example, wet bottomland soils, such as French, commonly join steeper, well drained terrace and upland soils, such as Unison, Evard, and Clifton.

Some pastures on steep side slopes are on eroded Fannin, Evard, and Clifton soils. These areas show cow paths, known as catsteps, on the contour that support very little forage. The rooting depth and available water-holding capacity is limited in these areas due to overgrazing, compaction, and erosion. These areas are easily susceptible to drought and further erosion.

Pastures on high mountain ridges and steep side slopes above 4,000 feet in elevation are subject to extreme winter conditions, especially on north-facing slopes. Pastures on these landscapes can be damaged by frost heave and late fall grazing,

Figure 22.—Differences in soil properties can occur within short distances in the same field. Pictured are fine-loamy Tate soils (left of center) and clayey Clifton soils (foreground) under hayland management.

which does not allow forage plants time to recover before winter dormancy. They also have a shorter growing season and receive more precipitation than those at lower elevations. These weather conditions make pasture establishment and maintenance more difficult.

Pastures tend to be more productive on uneroded side slopes and ridgetops where slopes are less than 30 percent, such as in areas of Clifton, Edneyville, Evard, Fannin, and Porters soils. Clifton soils, although eroded, can support good pastures in areas that do not have compacted cow trails, or catsteps, because of their relatively higher natural fertility. Cove soils, such as Tate and Tusquitee, support good pastures because of the high content of organic matter in the surface layer and the high available water-holding capacity of the subsoil.

Soil fertility.—In Buncombe County, the soils do not have natural fertility sufficient enough to produce hay and forage crops without soil amendments. This is due to naturally low levels of nutrients in the soil and an acidic soil environment. By decreasing soil acidity with applications of lime, the availability of nutrients and the activity of beneficial bacteria are increased. Lime also neutralizes exchangeable aluminum, thus reducing aluminum toxicity to crops. Incorporating lime into the soil before planting is important due to its slow movement into the root zone when applied to the surface. Both organic and chemical fertilizers increase nutrient levels in the soil. Soils in the survey area are naturally low in nitrogen and phosphorus. Some soils, such as Mars Hill and Walnut, naturally range from strongly acid to neutral (a pH range of 5.5 to 7.3). Optimum forage growth on these soils typically requires that lime be applied at a lower rate and with less regularity. A soil test is recommended, however, to determine proper application rates of lime and fertilizer. Other

considerations are cropping history and the hay or forage crop to be planted or maintained.

Timing of fertilizer application is very important in achieving maximum yields. A general guideline for cool-season forage is to fertilize at or just before periods of early growth. Depending on elevation, aspect, and the season's weather, fertilizer should be applied between late February and late March before spring growth occurs and between mid August and mid September before fall growth occurs.

Pest control.—Herbicides and other pesticides may be necessary for controlling weeds and harmful insects in the production of forage crops. The organic matter and clay content of the soil surface and the depth to the water table affect the amount and frequency of soil-applied herbicide and other pesticides. Soils such as Porters, Balsam, Tanasee, Wayah, Toecane, Tusquitee, Biltmore, Dellwood, Reddies, and Rosman have enough organic matter in the surface layer to inhibit the activity of soil-applied pesticides. Eroded soils, such as Clifton, Braddock, and Evard, may have enough clay in the surface layer to bind up pesticides.

The wet conditions of Nikwasi and French soils and areas with seeps and springs may reduce the effectiveness of soil-applied pesticides and allow the contamination of surface water and ground water. Saturated soils and areas with excess surface water from prolonged rains or irrigation can carry herbicides and other pesticides to surface waters. The contamination of surface water and ground water is also a concern for Biltmore, Rosman, Dellwood, and Reddies soils due to a high leaching rate caused by a low clay content. **Table 18** shows depth to water table and flooding frequency for soils in the survey area.

Using integrated pest management programs helps to avoid unnecessary pesticide applications. Crops are scouted to determine if pests are present and then monitored to determine when populations require control in order to prevent economic loss. This allows for the most timely, and thus the most cost-effective, use of the pesticide.

Other methods of weed control include the use of goats, biological agents, and mowing. These viable alternatives can be used alone or in combination with chemical weed control. The latest information on these types of weed control can be obtained at the local office of the North Carolina Cooperative Extension Service, the Buncombe Soil and Water Conservation District, or the Natural Resources Conservation Service.

Species.—The intended use should be considered when forage species are selected. The selected species should provide maximum quality and versatility in the forage program. Legumes generally produce higher quality feed than grasses. They should be grown to the maximum extent possible. The taller legumes, such as alfalfa and red clover, are more versatile than legumes that are used primarily for grazing, such as white clover. Orchardgrass, timothy, and tall fescue are well suited grasses.

The forage species selected for planting should be appropriate for the soil. Deep and very deep, well drained soils should be planted to the highest producing crops, such as alfalfa, or a mixture of alfalfa and orchardgrass or alfalfa and timothy. Sod-forming grasses, such as tall fescue and orchardgrass, minimize erosion in the steeper areas. Alfalfa should be seeded with cool-season grasses in areas where the soil is at least 2 feet deep and is well drained. Evard, Edneyville, Brasstown, Clifton, Unison, Fannin, and Tate soils are examples. Alfalfa does poorly on wet soils, such as French and Nikwasi. The more poorly drained soils and the soils that are less than 2 feet deep are suited to clover-grass mixtures or to pure stands of clover or grasses. Legumes can be established through renovation in areas that support sod-forming grasses.

Tall fescue is an important cool-season grass and thrives on soils well suited to both pasture and hay. It can also be established and performs very well on soils with high water tables or clayey subsoils and in eroded areas. Fescue is an excellent companion crop for legumes in pasture mixtures with ladino or red clover. It is a good practice to seed a legume with fescue in Buncombe County. In many pastures there is

an abundant supply of native White Dutch clover seed in the soil, and additional seeding is not necessary. The legume adds to the palatability and nutritive value of the grass and decreases the need for nitrogen fertilizers. For maximum production, nitrogen fertilizer should be applied during the period when the grass is accumulating. Care must be taken to minimize the effects of fescue toxicity caused by the fungus *Acremonium coenophilum*, which occurs on fescue plants. This fungus causes large reductions in animal health and performance.

Warm-season grasses that are planted during the period from early April through late May help to supplement cool-season grasses, such as tall fescue. They grow well during warm periods, especially from mid June through September, when the growth of cool-season grasses is slow. Examples of warm-season grasses are switchgrass, big bluestem, eastern gamagrass, indiangrass, and Caucasian bluestem. Annual summer grasses, such as sudangrass, pearl millet, and sorghum, can be valuable in providing silage and hay in a forage program. Cattle producers could use these grasses for summer forage when cool-season grasses become dormant.

Pastures of native bluegrass are on most soils in the county and are desired forage for horses and sheep. Bluegrass pastures could be improved by the use of high-analysis phosphate fertilizers, which encourage the growth of native White Dutch clover and increase the nutrition and quality of forage.

Orchardgrass, another important species, can grow anywhere that fescue thrives, except in wet areas, such as on French and Nikwasi soils. Orchardgrass has requirements similar to those of fescue but is more sensitive to overgrazing and weed competition. Rotational grazing helps to extend the life of this species. Orchardgrass is not infected by fescue fungus.

Erosion control.—The majority of pasture and hayland in Buncombe County is located on land that is too steep or wet to row crop. This can lead to a variety of erosion problems. For instance, severe streambank erosion and downstream sedimentation occur where livestock travel streambanks. Trout streams are particularly vulnerable to damage by sedimentation. Pasture rotation helps to prevent erosion. Fencing cattle away from streams and installing watering systems which utilize springs and wells help to prevent overgrazing.

Pastures on slopes of more than 30 percent are generally too steep for farm equipment. Lime and fertilizer must be applied by hand, or access roads must be built for farm equipment. Hand application of fertilizer and lime is usually uneven and results in poor stands of pasture which support fewer cattle. Poor vegetative cover encourages erosion, growth of unwanted weeds, and the encroachment of shrubs and trees into field borders. Where access roads are not economically feasible or hand applications of lime and fertilizer are not practiced regularly, timber production may bring a greater economic return.

Pasture establishment and rejuvenation may create erosion problems where slopes are more than 2 percent. Using proper planting dates helps to ensure a good stand in a timely manner. Alfalfa and cool-season forages, such as fescue, orchardgrass, clovers, and bluegrass, should be planted between mid March and mid April for best results. Warm-season forages, such as sudangrass, should be planted between mid March and mid April, when the danger of frost is past.

Maintenance of pasture and hayland.—Using rotational grazing, using proper stocking rates, implementing a well planned clipping and harvesting schedule, and removing livestock in time to allow forage plants to recover before winter dormancy help to maintain pastures and increases productivity. Following lime and fertilizer recommendations from soil tests helps to increase plant nutrient availability and maximizes productivity when establishing, maintaining, or renovating pasture and hayland.

Renovation can increase forage yields in areas that support a good stand of grass. The process includes partially destroying the sod, applying lime and fertilizer, and

seeding desirable forage species. Plowing is not recommended for forage establishment or rejuvenation. In plowed areas, the soil can crust over after a rain, resulting in a high seedling mortality rate. In addition, the bare soil is susceptible to severe erosion. Sowing seed directly into the existing sod is the preferred method (i.e., “zip seeding”). Adding legumes to the stand of grass provides high-quality feed and reduces the amount of nitrogen fertilizer needed. Legumes increase summer production and transfer nitrogen from the air into the soil.

Additional information about pasture and hayland can be obtained from the local office of the North Carolina Cooperative Extension Service, the Buncombe Soil and Water Conservation District, or the Natural Resources Conservation Service.

Orchards

Jeffrey H. Owen, Area Extension Forestry Specialist, North Carolina State University, helped prepare this section.

In 2002, according to the U.S. Census of Agriculture and North Carolina Cooperative Extension Service of Buncombe County, the county had approximately 35 acres of commercial orchards.

A variety of soils in Buncombe County have been managed very successfully for ornamental crops and orchards, including some which have been flagged as potential problem soils. Orchards in Buncombe County are grown for the “u-pick” and fresh markets and require intensive management and high maintenance. Ornamental crops are grown throughout the county on intermediate mountains, low mountains, and intermountain hills (Porters, Evard, and Edneyville soils), in coves and on terraces (Tate, Unison, and Tusquitee soils), and on flood plains (Rosman, French, Dellwood, and Reddies soils). Mountain and cove soils of valleys in the central and southern portions of the county are the major areas for growing ornamental crops.

A short discussion of several points relative to managing orchard crops follows. More detailed information and technical assistance may be obtained from the North Carolina Cooperative Extension Service, the Natural Resources Conservation Service, and the Buncombe Soil and Water Conservation District.

Growers should review the “Detailed Soil Map Units” section and the information in **table 5** on map unit composition, soil properties and behavior, as well as management concerns, considerations, and suitability ratings. The thickness and texture of soil layers is shown in the USDA texture column in **table 15**. **Table 16**. shows the general range of clay in the surface layer and organic matter content. **Tables 17 and 18** show depth to bedrock, water table, and flooding frequency for soils in the survey area. These figures represent what is typical across the county. Conditions of individual map units may vary.

Map Unit Suitabilities

Table 5 shows the suitability of soils in the survey area for apple orchards, Fraser fir production, ball and burlap harvesting, line-out beds, and vegetable production. In the table, *well suited, suited, poorly suited,* and *unsuited,* are used to indicate the degree to which the major soil and naturally occurring map unit characteristics limit the production of orchards and ornamentals. These suitability ratings are guides for consideration by commercial operations with goals that include maintaining the integrity of the ecosystem, a sustainable harvest, and a cost-effective level of management. Slope is considered a limitation for safe equipment use. Ratings are based on land that is presently cleared. The cost of land clearing and the impact on the soil resource will lower the suitability. The size of a management area and/or condition of the soil resource due to past management decisions was not considered. Soil limitations may be overcome with increased management, which in turn increases

the cost of production. The cost of doing business varies from site to site and depends on short- and long-term management goals and the unique set of soil, plant, landscape, and climatic relationships found there. An onsite investigation is recommended to determine site-specific conditions, especially on flood plains, in drainageways, in map units with slopes of more than 30 percent, and on sites at elevations above about 4,000 feet.

Technical assistance may be obtained from the local office of the North Carolina Cooperative Extension Service, the Buncombe Soil and Water Conservation District, or the Natural Resources Conservation Service.

Soil-Plant-Landscape-Climate Relationships

Selecting apple varieties to manage is dependent on an assortment of soil, plant, landscape, and climatic variables and their interactions. These include apple variety requirements, past land management, elevation, aspect, landscape position, soil type, and rainfall. Site preparation, maintenance, related management costs, and market demand should also be considered. An onsite investigation is recommended to determine site-specific conditions, especially on flood plains, in drainageways and coves, in map units with greater than 30 percent slopes, and on sites above elevations of 3,800 feet.

Naturally occurring site factors influence site productivity and are important to consider. Elevation and aspect affect the amount of sunlight a site receives and the rate of evaporation. Higher elevations host shorter growing seasons and/or harsh climates. Soils on cool north- to east-facing aspects generally have a surface layer that is thicker and has more organic matter than that of soils on warm slopes. Due to the cooler air temperatures associated with the north- to east-facing aspects, there is a potential for late spring frost to damage new growth in some years. Slow air drainage and/or frost pockets may also allow late spring frost to damage new growth in some years in drainageways and coves. Sites on south-facing slopes are warmer and drier than those on north-facing slopes. Examples of soils on warm side slopes are Evard and Edneyville. Porters soils are on cool side slopes, and Tate and Tusquitee soils are in coves and on footslopes. Floodplain soils are not suited to orchards due to soil wetness, flooding, and the high potential of frost damage.

The amount of rainfall, elevation, and length of growing season also influence site productivity. Summer rainfall in the survey area is variable. Growth on shallow and moderately deep soils, such as Ashe, Chestnut, Cowee, and Lauada soils, is limited by a low available water-holding capacity. While rainfall generally increases with elevation, productivity gains may be offset by the shorter growing season and/or climatic conditions. For orchards, the most productive sites are generally below about 3,800 feet in elevation.

Topography should be uniform and sloping to allow for good air drainage and to minimize the occurrence of frost pockets. The steepness and length of slopes, landform shape, and position on the slope also affect water movement and availability. Sites that are gullied and have ravines or sites with abrupt slope changes should be avoided. Trees planted in wet soils, in soils subject to flooding, in areas affected by seeps and springs, or in natural drainageways produce low yields and are more susceptible to disease. Orchards should be established near an adequate supply of water. Good sites are in areas of very deep, well drained soils. Examples are Evard, Edneyville, Clifton, and Tate soils.

Layout and Erosion Control

The layout of an orchard should include outlets for water flowing from the higher areas and for water flowing out of the orchard. Field borders and diversions, which

empty into grassed waterways, dispose of flowing water without causing erosion. A healthy ground cover controls runoff, allows for greater infiltration into the soil, and reduces evaporation losses. Sod should be established between rows of trees and on all roads and erosion-control structures. It should be established as construction proceeds. Rows of trees should be laid out on the contour or the across slope and as nearly parallel to each other as possible. This arrangement helps to control erosion and allows for easy access. Planning for access roads is very important. Short or dead end roads, which make equipment use difficult and roads with sharp turns or grades above 10 percent should not be constructed. Wet areas or natural drainageways should be avoided. Water bars, side ditches, and culverts should be installed when these areas are unavoidable.

Soil Quality

A short discussion of several points relative to soil quality improvements follows. Enhanced soil quality can help to reduce the onsite and offsite cost of soil erosion, improve nutrient utilization, and ensure that the soil resource is sustained for future use. The soil's physical, chemical, and biological properties must be at optimal levels for high yields to be maintained on a sustainable basis.

Soil fertility.—The soils in Buncombe County have insufficient natural fertility to sustain orchards. Typically, they are acidic and low in nitrogen and phosphorus. Both organic and chemical fertilizers increase nutrient levels in the soil. By decreasing soil acidity with lime, the availability of nutrients and the activity of beneficial bacteria are increased. Lime also neutralizes exchangeable aluminum, reducing aluminum toxicity to crops. Applications of lime and fertilizer should be determined by soil tests and by plant tissue analysis. Incorporating lime into the soil before trees are planted is important due to its slow movement into the root zone when applied to the surface. Lime and fertilizer should also be applied to access roads and erosion-control structures to maintain the sod.

Soil biological improvements.—Optimum soil quality supports a sustainable harvest and a cost-effective level of management and cannot be achieved unless the soil supports a diverse, strongly active biological community. A single handful of such a soil will contain more individual microbes, micro-arthropods, and other life forms than there are people on earth. Organic matter is the key to the biological health of the soil. It serves as the food source for numerous types of beneficial bacteria, fungi, protozoa, nematodes, micro-arthropods, and larger animals. Biological improvements require more organic matter, healthy cover crops, and a careful selection and application of herbicides and other pesticides. These improvements will also benefit the soil's physical and chemical components. The available supply of nutrients for plant growth is affected by several soil properties, including the organic matter content of the surface layer. Decomposition of organic matter to humus and the mineralization of humus release nitrogen and other nutrients, such as calcium, magnesium, and potassium, to plants. Organic matter can be added to the soil in some cases or be allowed to build up in place under cover crops. Removing the cover crop with herbicides or tillage allows the rapid break down of organic matter.

Pest control.—Herbicides and other pesticides may be necessary for controlling weeds, harmful insects, and disease and, where possible, should be applied by banding or spot treatment. Label directions must be followed to control target organisms and minimize the contamination of soil, water, air, and nontarget organisms. Soil properties, such as organic matter content and clay content of the surface layer, affect the rate of soil-applied applications. Estimates for these properties were determined for the soils in this survey area. The thickness and texture of the soil layers is shown in the USDA texture column in **table 15**. **Table 16** shows the general

range of clay throughout the soil and the general range of organic matter content in the surface layer.

In some areas, the organic matter content of a soil may be outside the range shown in **table 16**. The content may be higher in soils that have received high amounts of animal or manmade waste. Soils that have recently been brought into cultivation (pasture conversion) may have a higher organic matter content in the surface layer than similar soils that have been cultivated (cropland conversion). Lower levels of organic matter are common in soils where the surface layer has been partly or completely removed by erosion, land smoothing, or other activities, such as woodland clearing.

Soils such as Porters and Tusquitee have enough organic matter in the soil surface layer to inhibit the activity of the soil-applied pesticide. Current soil tests should be used to measure the organic matter content before soil-applied rates are determined. Refer to the label of the pesticide container for further instructions. Eroded soils such as Clifton and Evard may have enough clay in the surface layer to bind herbicide and other pesticides.

Conditions in the wet French and Nikwasi soils and in areas with seeps and springs may reduce the effectiveness of soil-applied pesticides and allow surface and ground-water contamination. On saturated soils and in areas with excess surface water from prolonged rains or irrigation, herbicides and other pesticides can be carried to surface waters. Surface and ground-water contamination is also a concern in Biltmore, Rosman, Dellwood, and Reddies soils due to a high leaching rate caused by low clay content. **Table 18** shows depth to water table and flooding frequency for soils in the survey area.

Erosion-control practices, such as permanent ground cover and grassed filter strips in drainageways and field borders, help to minimize soil loss and runoff that can carry absorbed or dissolved herbicides and other pesticides to surface waters. Utilizing weather forecasts and scheduling irrigation so it does not conflict with herbicide and pesticide use reduce contamination problems.

The pesticide product labels show specific application rates based on the organic matter content and clay content of the soil. Please refer to the “Detailed Soil Map Units” section and **table 5** for information on map unit composition, soil properties and behavior, and management concerns and considerations.

Integrated pest management programs avoid unnecessary pesticide applications. Orchards are scouted to determine if pests are present and then monitored to determine when populations merit control in order to prevent economic loss. This allows for the timeliest use of the pesticide and thus the most cost-effective alternative.

Other methods of weed, pest, and disease control include the use of goats, biological agents, mulching, hand weeding, and mowing. These viable alternatives can be used alone or in combination with chemical control. The latest information on these types of control can be obtained at the local office of the North Carolina Cooperative Extension Service, the Buncombe Soil and Water Conservation District, or the Natural Resources Conservation Service.

Ornamental Crops

Jeffrey H. Owen, Area Extension Forestry Specialist, North Carolina State University, helped prepare this section.

In 2002, according to the U.S. Census of Agriculture and North Carolina Cooperative Extension Service of Buncombe County, the county had approximately 1,275 acres of ornamental crops.

A short discussion of several points relative to managing ornamental crops follows. More detailed information and technical assistance may be obtained from the North

Carolina Cooperative Extension Service, the Natural Resources Conservation Service, and the Buncombe Soil and Water Conservation District.

Growers should review the “Detailed Soil Map Units” section and the information in **table 5** for map unit composition, soil properties and behavior, as well as management concerns, considerations, and suitability ratings. The thickness and texture of soil layers is shown in the USDA texture column in **table 15**. **Table 16** shows the general range of clay and the general range of organic matter content in the surface layer. **Tables 17 and 18** show depth to bedrock, water table, and flooding frequency for soils in the survey area. This data represents what is typical across the county. Conditions of individual map unit delineations may vary.

Map Unit Suitabilities

Suitability ratings are guides for consideration by commercial operations with goals that include maintaining the integrity of the ecosystem, a sustainable harvest, and a cost-effective level of management. Ratings are based on land that is presently cleared. The cost of land clearing and the impact on the soil resource will lower the suitability. Size of a management area and/or condition of the soil resource due to past management decisions was not considered. Two examples of soil conditions that negatively affect current productivity and suitability are severe erosion and soil compaction. Slope is considered a limitation for safe equipment use.

Table 5 rates the soils for their ability to produce some of the ornamental crops in Buncombe County. *Well suited, suited, poorly suited,* and *unsuited* are used to indicate the degree of the major soil limitations to be considered in ornamental crop production. *Well suited* indicates that no limitations affect production although inclusions of limiting, dissimilar soil or site features may be present. *Suited* indicates that one or two limitations affect production. *Poorly suited* indicates that two or more limitations affect production. Some of these limitations may be overcome by higher levels of management which, in turn, increase the cost of production. *Unsuited* indicates the occurrence of limitations that cannot be overcome.

An onsite investigation is recommended to determine site-specific conditions, especially on flood plains, in drainageways, in map units with slopes of more than 30 percent, and on sites at elevations above about 4,000 feet.

Technical assistance may be obtained from the local office of the North Carolina Cooperative Extension Service, the Buncombe Soil and Water Conservation District, or the Natural Resources Conservation Service.

Soil-Plant-Landscape-Climate Relationships

Ornamental crops are grown throughout Buncombe County and include Christmas trees (fig. 23); landscaping plant materials, such as, mountain laurel, rhododendron, hemlock, boxwood, and other species of native trees, shrubs, and herbaceous plants; vineyards; and medicinal plants and herbs. Hybrid trees and shrubs, such as holly, juniper, and yews, are also grown. Selecting species to grow is dependent on a variety of soil, plant, landscape, and climatic variables and their interactions. These include individual species requirements, past land management, elevation, aspect, landscape position, soil type, and rainfall. Site preparation, maintenance and related management costs, and market demand should also be considered. An onsite investigation is recommended to determine site-specific conditions, especially on flood plains, in drainageways and coves, in map units with greater than 30 percent slopes, and on sites with elevations above 4,000 feet.

Elevation and aspect.—Naturally occurring site factors are important to consider due to their influence on site productivity and a wide variety of management decisions. In general, the most productive sites are generally below 4,000 feet in elevation.

Figure 23.—Fraser fir in an area of Porters-Unaka complex, 15 to 30 percent slopes, stony. Christmas trees are an important part of the ornamental crop industry in Buncombe County.

Higher elevations give rise to shorter growing seasons and/or harsh climates as compared to lower elevation sites. Aspect affects the amount of sunlight a site receives and the rate of evaporation. Soils on cool north- to east-facing aspects generally have a surface layer that is thicker and has more organic matter than that of soils on warm slopes. Due to the cooler air temperatures associated with the north- to east-facing aspects there is a potential for late spring frost to damage new growth in some years. Slow air drainage and/or frost pockets may allow late spring frost to damage new plant growth on flood plains, in drainageways, and in coves. Sites on south-facing slopes are warmer and drier than those on north-facing slopes. Evard, Mars Hill, and Edneyville soils occur on warm side slopes. Porters soils occur on cool side slopes, and Tate and Unison soils are in coves and on footslopes. Rosman, Reddies, and Dellwood soils occur on flood plains.

Rainfall and droughtiness.—The amount of rainfall, elevation, and length of growing season influence site productivity. Summer rainfall in the survey area is abundant but uneven. While rainfall generally increases with elevation, productivity gains may be offset by the shorter growing season and/or climatic conditions. Growth on soils that are shallow or moderately deep to bedrock, such as Cleveland, Ashe, Burton, Chestnut, Cowee, and Unaka soils, is limited by a low water-holding capacity. In addition, soils such as Lauada, Micaville, and Brownwood that have high mica content are also limiting due to a low water-holding capacity.

Landform and soil water.—The position on a landform, steepness and length of slope, as well as landform shape (such as convex or concave) affect water movement and availability. A healthy ground cover controls runoff, allows greater water infiltration into the soil, and reduces evaporation losses. In areas where water ponds or concentrates, such as toeslopes, footslopes, drainageways, concave areas, and depressional areas, Fraser fir and other susceptible ornamentals are susceptible to phytophthora root disease. These areas should be avoided. Phytophthora root disease is a concern for upland, cove, and flood plain sites regardless of landform or soil type

(fig. 24). If the fungus has been introduced to any site and during an extended rainy period soils become saturated with water, root disease can be established and spread.

Other soil-site properties.—Native and hybrid ornamental crops grow well on well drained, loamy soils. There should not be so many surface stones, boulders, and coarse fragments in the soil to hinder cultivation or ball and burlap harvesting. Depth to bedrock should not limit rooting depth. Sites should be protected, especially at the higher elevations, from northwest winter winds which can desiccate plants. Flooding even on an occasional basis is of concern due to the extended length of time ornamental crops are in the field.

Clay content.—The clay content should be between 15 to 30 percent for optimum propagation and ball and burlap harvesting. Soils with a low clay content may need supplemental irrigation due to a low water-holding capacity and droughtiness. Soils with clay contents less than 15 percent in the top 20 inches of soil should not be used for ornamental species that are to be ball and burlap harvested. These soils do not cling together and thus ball poorly. Soils that have a clay content of more than about 30 percent should not be used for ornamental species. These soils hold excess moisture around roots, which can result in poor growth and encourages phytophthora root disease. Access with machinery is limited when the soil is wet. Also, soils that have a high clay content can only be dug within in a narrow range of soil moisture. This prevents damage to the root ball but may not coincide with harvest schedules.

Upland soils such as Evard, Edneyville, and Porters are suited to adapted ornamental crops as are the colluvial Tate soils. The flood plain Rosman, Dellwood, and Reddies soils are also used to grow certain adapted ornamentals. Floodplain soils present special management concerns due to a low water-holding capacity, moderately rapid or rapid internal drainage, surface fragments, cold air drainage, frost, and flooding frequency.

Figure 24.—Ornamentals on Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded. Floodplain soils present special management concerns and only ornamentals adapted to these conditions should be planted.

Erosion control, site preparation, and access.—Disturbing as little of the planting area as possible helps to prevent excessive erosion, maintains water quality, and protects the beneficial soil surface. Once a site is prepared and planted, areas between plants rows should remain in permanent vegetative cover. Planting in a grid arrangement allows for easy access by hand labor and equipment used for mowing or harvesting. Sites should be selected in areas that have an adequate supply of clear water for irrigation.

Roads.—Access roads should be carefully planned and constructed on the contour. They should not be constructed in natural drainageways, in wet areas, or where the roadbed grade would exceed 10 percent slope. Limitations based on depth to bedrock, the presence of rocky areas, and the quantity of surface stones and boulders should also be considered. Vegetating cleared, graded, and cut and fill slopes as construction proceeds and using erosion-control structures, such as silt fences or catch basins, help to maintain soil stability and prevent sediments from leaving the site. Roads should be graveled or seeded with perennial vegetation, which allows for year-round use. Lime and fertilizer should be applied regularly to maintain the sod. Refer to the “Access Roads” part of this section for more detailed information.

Marginal sites.—Areas that are forested and would require major timber and stump removal are less favorably suited to ornamental and Christmas tree production. Clearing woodland and converting it to ornamental crop production would create a severe erosion potential and is not recommended. A positive cost-benefit ratio, especially for clearing slopes greater than 30 percent, is uncertain.

Map units that have slopes of more than 30 percent are marginal due to limitations to safe equipment use. Access roads might be built and maintained, but they in turn increase the cost of production. Labor costs and the amount of time needed for harvest increase on these steep and very steep slopes. Also, plant shape (lower branches) can be detrimentally affected on the uphill side of tree trunks or plant stems. Loss of the bottom whorl of a Christmas tree due to slope will add 1 or 2 years to a rotation.

Line-out beds.—Line-out beds should be located near an adequate supply of clear water for irrigation. They require soils with about 10 to 15 percent clay in the upper 8 to 12 inches. Soils that have more clay hold seedling roots so tightly that tearing and breaking can result during harvesting. Such soils also hold water longer, providing a window for phytophthora root rot to grow. Floodplain soils that have dark, sandy surface layers, such as Rosman and Reddies, are suited to line-out beds but require irrigation. Cove and upland soils with dark surface layers, such as Tusquitee and Porters, may also be suited to line-out beds. Their relatively high clay content and organic matter content in the surface layer may be prohibitive due to a high water-holding capacity and the related susceptibility to phytophthora root disease.

Soil Quality

The following paragraphs discuss several points related to soil quality improvements. Enhancing soil quality can help to reduce the onsite and offsite cost of soil erosion, improve nutrient utilization, and ensure that the soil resource is sustained for future use. The soil’s physical, chemical, and biological properties must be at optimal levels for production levels to be maintained on a sustainable basis.

Soil fertility.—While the soils in Buncombe County are acidic and generally low in natural fertility, ornamental crops benefit from soil amendments of lime, fertilizer, and organic matter. Following lime and fertilizer recommendations from soil tests and plant tissue analysis helps to increase the availability of nutrients and is a critical aspect of all management plans, large or small. Since calcium and phosphorus tend to remain in the surface of the soil when top-dressed, incorporation of lime and fertilizer into the soil prior to planting is beneficial. Soil’s physical, chemical, and biological properties

must be at optimal levels for production levels to be maintained on a sustainable basis.

Both organic and chemical fertilizers increase nutrient levels in the soil. Application rates are plant specific and should be based on soil tests and plant tissue analysis. Lime and fertilizer should also be applied to access roads and erosion-control structures to maintain the ground cover. Hand application may be required on steep slopes but the benefits of liming and fertilization should not be underestimated. The wet conditions of French soils (and upland areas with seeps and springs) may reduce the effectiveness of the fertilizers and lime and/or allow for surface and ground-water contamination. Surface and ground-water contamination is also a concern in Dellwood and Reddies soils due to a high leaching rate and the depth to a water table. **Table 18** shows the depth to the water table and the flooding frequency for soils in the survey area.

Liming requirements are a major concern because high acidity in the soil reduces the availability of nutrients to plants and affects the activity of beneficial bacteria and the other components of the soil's biological community. Lime neutralizes exchangeable aluminum. This counteracts the adverse effects that high levels of aluminum impose on many crops. Liming with calcitic lime adds calcium while liming with dolomitic lime adds both calcium and magnesium to the soil.

Soil tests also indicate the need for nitrogen, phosphorus, and potassium fertilizer. Phosphorus and potassium levels will vary from field to field due to soil type and past management. Unlike nitrogen, their levels tend to build up in the soil over time if fertilizer has been applied on a regular basis.

Nitrogen fertilizer is required for most crops. Appropriate rates depend on the crop and the potential productivity of the soil. Excessive application of nitrogen beyond what the plant can use during the growing season is not a recommended practice. The excess fertilizer not utilized by the crop creates an unnecessary expense and can result in water pollution through leaching or runoff. Nitrogen can be readily leached from the more sandy textured soils, such as Rosman, Dellwood, and Reddies, so that it becomes deficient in wet seasons. Split applications of nitrogen may be more effective on these soils during the growing season. Nitrogen rates may be reduced on fields provided that organic matter levels are high. Where the ground cover has been removed by tillage or with herbicides, organic matter tends to break down more rapidly. Erosion-control practices, such as a permanent ground cover and grassed filter strips in drainageways and field borders, help to increase organic matter content and minimize soil loss and runoff that can carry adsorbed or dissolved fertilizer to surface waters.

Soil biological improvements.—Optimum soil quality supports a sustainable harvest and a cost-effective level of management and cannot be achieved unless the soil supports a diverse, strongly active biological community. Organic matter is the key to the biological health of the soil. It serves as the food source for numerous types of beneficial bacteria, fungi, protozoa, nematodes, micro-arthropods, and larger animals. Biological improvements require more organic matter, healthy cover crops, and a careful selection and application of herbicides and other pesticides. These improvements will also benefit the soil's physical and chemical components. The available supply of nutrients for plant growth is affected by several soil properties, including the organic matter content of the surface layer. Decomposition of organic matter to humus and the mineralization of humus release nitrogen and other nutrients, such as calcium, magnesium, and potassium, to plants. Organic matter (composted or decayed) can be added to the soil in some cases or be allowed to build up in place under cover crops. Removing the cover crop with herbicides or tillage allows for the rapid break down of organic matter.

Pest control.—Herbicides and other pesticides may be necessary for controlling weeds, harmful insects, and disease and should be applied by banding or spot

treatment. Label directions must be followed to control target organisms and minimize contamination of soil, water, air, and nontarget organisms. Soil properties, such as organic matter content and clay content of the surface layer, affect the rate of soil-applied pesticides. Estimates for these properties were determined for the soils in Buncombe County. The thickness and texture of the soil layers are shown in the USDA texture column in **table 15**. **Table 16** shows the general range of clay content and the general range of organic matter content in the surface layer.

In some areas, the organic matter content of a soil may be outside the range shown in **table 16**. The content may be higher in soils that have received high amounts of animal or manmade waste. Soils that have recently been brought into cultivation (pasture conversion) may have a higher organic matter content in the surface layer than similar soils that have been cultivated (cropland conversion). Lower levels of organic matter are common in soils where the surface layer has been partly or completely removed by erosion, land smoothing, or other activities, such as woodland clearing.

Pesticide effectiveness.—Soils such as Porters, Wayah, Oconaluftee, Dellwood, Reddies, and Rosman have enough organic matter in the surface layer to inhibit the activity of the soil-applied, pre-emergent herbicides and other pesticides. Current soil tests should be used to measure the organic matter content before soil-applied rates are determined. Eroded soils such as Clifton and Fannin may have enough clay in the surface layer to bind pre-emergent herbicides and other soil-applied pesticides. Where these types of soils are managed, growers should refer to the label of the pesticide container for specific instructions and application rates.

Conditions of the wet French and Nikwasi soils and areas with seeps and springs may reduce the effectiveness of some pesticides and allow surface and ground-water contamination. Saturated soils and areas with excess surface water from prolonged rains or irrigation can carry herbicides and other pesticides to surface waters. Surface and ground-water contamination is also a concern in Rosman, Dellwood, and Reddies soils due to a high leaching rate caused by a low clay content. **Table 18** shows the depth to the water table and flooding frequency for soils in the survey area.

Erosion-control practices, such as permanent ground cover and grassed filter strips in drainageways and field borders, help to minimize soil loss and runoff that can carry absorbed or dissolved pesticides to surface waters (fig. 25). Utilizing weather forecasts and scheduling irrigation so it does not conflict with pesticide use reduce contamination problems.

Integrated pest management.—Integrated pest management programs avoid unnecessary pesticide applications. Crops are scouted to determine if pests are present and then monitored to determine when populations merit control in order to prevent economic loss. This allows for the timeliest use of the pesticide and thus the most cost-effective approach to chemical control of pests.

Other methods of weed, animal, and disease control include the use of goats, biological agents, mulching, hand weeding, and mowing. These viable alternatives can be used alone or in combination with chemical control. The latest information on these types of control can be obtained at the local office of the North Carolina Cooperative Extension Service, the Natural Resources Conservation Service, or the Buncombe Soil and Water Conservation District

Phytophthora.—Phytophthora root rot is a soil-borne disease caused by the fungus *Phytophthora cinnamomi*. It is a problem where the movement of air and water is restricted in the soil. This restricted movement may be a function of a high organic matter content in the surface layer, clay content, soil compaction, a seasonal high water table, or soil wetness caused by flooding, ponding, overland flow of storm water, or an extended wet spell where soils remain saturated.

In areas that receive high amounts of water, a high organic matter content in the

Figure 25.—Erosion-control practices, such as permanent ground cover, field borders, and grassed filter strips in drainageways, help to minimize soil loss and runoff that can carry absorbed or dissolved pesticides to surface waters.

surface layer may hold water long enough and on a frequent enough basis to allow phytophthora to take hold. This is also a concern where the soil is compacted or the clay content in the surface surface layer or subsoil differs enough that percolation is slowed or stopped and water perches.

In landscape positions where water concentrates, such as toeslopes, footslopes, drainageways, areas below wet-weather seeps and springs, and concave and depressional spots, trees are susceptible to phytophthora root rot. All map units potentially contain these areas. These areas should be avoided.

The fungus can also be transported from field to field on equipment, by flooding, and by storm water runff. Potential contamination of irrigation ponds and streams by storm water runoff from contaminated fields should also be considered.

There is also a possibility of transporting phytophthora to the field on plants from infected line-out beds. The before mentioned soil-site conditions and considerations apply to locating and establishing line-out beds. Proper drainage and protection from flooding, overland flow, and ponding of storm water are critical to establishing and maintaining healthy line-out beds.

Yields per Acre

The average yields per acre that can be expected of principal crops under a high level of management are shown in **table 6, parts I and II**. In any given year, yields may be higher or lower than those indicated in the table due to variations in rainfall and other climatic factors. Soil quality and the effects of past management decisions affect present day yields. The land capability classification of each map unit is also shown in the table.

The yields are based mainly on the experience and records of Buncombe County farmers, conservationists, and agricultural extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The high level of management needed to realize the estimated yields depends on the kind of soil and the crop. Management can include erosion control, protection from flooding; proper planting and seeding rates; planting high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

A high level of management also includes maintaining proper soil reaction and fertility levels as indicated by soil tests. Favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements are critical. The application of nitrogen in excess of that required for potential yields generally is not recommended. The excess nitrogen fertilizer that is not utilized by the crop is an unnecessary expense and can result in surface and ground-water pollution. Because nitrogen can be readily leached from sandy soils, applications may be needed on these soils more than once during the growing season.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in **table 6** are grown in the survey area, but estimated yields are not listed as the acreage of such crops is presently small. The Buncombe County offices of the Natural Resources Conservation Service and the North Carolina Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops *(19)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by numerals 1 through 8. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation.

Class 7 soils have very severe limitations that make them unsuitable for cultivation.

Class 8 soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation; *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Prime Farmland and Other Farmland of Statewide Importance

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. The slope ranges mainly from 0 to 8 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 29,579 acres of Buncombe County, about 7 percent of the total acreage, meets the soil requirements for prime farmland. About 38,755 acres, about 9 percent of the total acreage, meets the soil requirements for farmland of statewide importance. This acreage does not quite meet the requirements for prime farmland. Approximately 46,481 acres, 11 percent of the total acreage, is farmland of local importance. This acreage pertains to land previously cleared and in (at least) pasture or hayland production and includes orchards and vineyards, seed beds and lineout beds for ornamental crop production, and Christmas tree production. Most areas require a more hands-on approach to production, less mechanization, and less ground-disturbing activities than typical row crop production. The costs of production are considered acceptable by the producer and the agricultural community. The very stony units are dominantly pastured.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland and farmland of statewide and local importance are listed in **table 7**. The list does not constitute a recommendation for a particular land use. On some soils included in the list, measures used to overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in **table 4**. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading “Detailed Soil Map Units.”

Hydric Soils

In this section, hydric soils are defined and described and the hydric soils in the survey area are listed.

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and hydrology *(5, 6, 7, 10, 15)*. Areas identified as wetlands must meet criteria for each of the characteristics. Undrained hydric soils that have natural vegetation support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses are capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the profile *(7)*. These soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. To determine whether a specific soil is a hydric or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Criteria which identify the estimated soil properties that are unique to hydric soils have been established *(5, 6)*. These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria are selected estimated soil properties, which are described in “Soil Taxonomy” and “Keys to Soil Taxonomy” *(20, 22)* and in the “Soil Survey Manual” *(21)*.

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators that can be used to make onsite determinations of hydric soils in Buncombe County are specified in “Field Indicators of Hydric Soils in the United States” *(10)*.

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. The determination of an appropriate indicator may require a greater depth. Soil scientists excavate and describe the soils deep enough to understand the redoximorphic processes. After completing the soil description, soil scientists can compare the soil features required by each indicator and the conditions observed in the soil and determine which indicators occur. The soil can be identified as a hydric soil if one or more of the approved indicators occur.

This survey can be used to locate probable areas of hydric soils.

Table 8 lists the map units that meet the requirements for hydric soils and also have at least one of the hydric soil indicators. This list can help to plan land uses, but onsite investigation is needed to determine the occurrence of hydric soils on a specific site *(10, 15)*.

Map units consisting of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions of the landform, and map units consisting of nonhydric soils may have inclusions of hydric soils in the lower positions of the landform.

Table 8 also lists map units that generally do not meet the requirements for hydric soils because they do not have one of the hydric soil indicators. A portion of these map units, however, may include hydric soils. Onsite investigation is needed to determine whether or not hydric soils occur and the location of included hydric soils.

Woodland Management and Productivity

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Owners of forestland in Buncombe County have many objectives. These objectives include producing timber; conserving wildlife, soil, and water; preserving esthetic values; and providing opportunities for recreational activities, such as camping and hunting. Public demand for clean water and recreational areas creates pressures and opportunities for owners of forestland.

The landowner interested in timber production is faced with the challenge of producing greater yields from smaller areas. These smaller areas are primarily due to trends in land ownership, including increased residential and commercial development. Meeting this challenge requires intensive management and silvicultural practices. Extensive practices directed toward ecosystem management would incorporate appropriate harvest regimes, such as uneven-age timber stand management and shelter wood. Many modern silvicultural techniques resemble the ones long practiced in agriculture. They include establishing, releasing, and thinning a desirable young stand (fig. 26); propagating the more productive species or genetic varieties; providing appropriate rotations and fiber utilization; and controlling insects, diseases, and undesirable species. Although timber crops require decades to grow, the goal of intensive management is similar to that of intensive agriculture. It is to produce a sustainable yield of the most valued crop while maintaining the integrity of the ecosystem.

Forestland covers about 273,615 acres, or about 65 percent of the land area of Buncombe County. Of this, timberland or commercial forest covers about 266,786 acres, or 63 percent of the county. U.S. Forest Service timberland, in the Pisgah District, covers about 31,461 acres, or about 8 percent of the county. Timberland or commercial forest is land that is producing, or is capable of producing, crops of industrial wood and that has not been withdrawn from timber production by government statute or administrative designation. Northern red oak, yellow-poplar, and eastern white pine are the most important commercial timber species in the county because they are adapted to the soil and climate and bring the highest average sale value per acre. Acreage figures were adjusted based on the Continuous Inventory of Stand Condition (CISC) database maintained by the U.S. Department of Agriculture, Forest Service, National Forests in North Carolina. Land classes (in CISC) for mountain lands managed by the National Forests in North Carolina are in accordance with Management Area criteria and emphases as detailed in the Land and Resource Management Plan, Amendment 5, Nantahala and Pisgah National Forests, March 1994.

For purposes of forest inventory, the predominant forest types identified in Buncombe County are as described in the following paragraphs:

Figure 26.—Thinned yellow-poplar in an area of Porters-Unaka complex, 15 to 30 percent slopes, stony. This species responds well to timber stand improvement, resulting in improved productivity.

Spruce-fir. This forest type covers 4,926 acres. It is predominantly red spruce or Fraser fir, or both. Commonly included trees are sugar maple and yellow birch.

White pine-hemlock. This forest type covers 5,573 acres. It is predominantly eastern white pine. Commonly included trees are hemlock, red maple, and sweet birch.

Shortleaf pine. This forest type covers 10,179 acres. It is predominantly shortleaf pine and Virginia pine in combination and constitutes a plurality of the stocking. Commonly included trees are pitch pine, scarlet oak, chestnut oak, white oak, and red maple.

Oak-pine. This forest type covers 19,763 acres. It is predominantly hardwoods, commonly upland oaks. Pine species make up 25 to 50 percent of the stand. Commonly included trees are hickory, red maple, and yellow-poplar.

Maple-beech-birch. This forest type covers 2,512 acres. It is predominantly sugar maple, American beech, yellow birch, or a combination of these species. Commonly included trees are northern red oak, white ash, hemlock, and black cherry.

Oak-hickory. This forest type covers 234,557 acres. It is predominantly upland oaks or hickory, or both. Commonly included trees are yellow-poplar, red maple, and black locust.

For purposes of management, forest types are generally grouped as follows: yellow pine, eastern white pine, upland hardwoods, cove hardwoods, northern hardwoods, and spruce-fir. The characteristics of a given site indicate which forest type will grow best on that site and are discussed later in this section.

Yellow Pine (SAF-75 & 79: Shortleaf Pine and Virginia Pine). This forest type generally occurs on abandoned cropland, in areas that have been cleared or burned and reseeded, and on soils of low productivity on dry, hot ridges and side slopes in the low mountains. Shortleaf pine, pitch pine, and Virginia pine are the dominant species. This type occurs primarily in the Asheville Basin and generally at elevations below 3,000 feet. Various dry-site hardwoods, such as scarlet oak, chestnut oak, blackgum, and sourwood, are associated with this forest type. Soils that are underlain by high-

grade metamorphic parent material commonly support this forest type. They include Clifton, Evard, Cowee, Mars Hill, Walnut, and Oteen soils. In addition, soils such as Sylco, Cataska, Junaluska, and Brasstown in areas underlain by metasedimentary parent material and Fannin, Lauada, Micaville, and Brownwood soils in areas with a high content of mica in the parent material also support this forest type.

Eastern White Pine (SAF-21: Eastern White Pine). This forest type occurs on a wide range of well drained cove and upland sites that previously supported the oak-hickory forest type or in abandoned pastures. Before fire control, white pine may have occupied moist slopes where fires were infrequent or of low intensity. This forest type produces a higher volume of wood and has a shorter rotation than other upland forest types. In Buncombe County, eastern white pine regenerates naturally where there is a seed source; however, in many areas it is planted. Elevations are mostly below 3,500 feet but can range up to 4,000 feet. Various dry-site hardwoods, such as scarlet oak, chestnut oak, blackgum, and sourwood, are associated with this forest type. Soils that are underlain by high-grade metamorphic parent material commonly support this forest type. They include Clifton, Evard, Cowee, Edneyville, Chestnut, Marshill, and Walnut soils. In addition, soils such as Fannin, Lauada, Micaville, and Brownwood in areas with a high content of mica in the parent material support this forest type.

Upland hardwoods (SAF-52: White Oak-Black Oak-Northern Red Oak). This forest type occurs on upland side slopes and ridges on various aspects up to about 4,000 feet in elevation. This is the most extensive forest type in the county. It also produces the lowest volume of wood per acre and shows the most effects of past high grading. If properly managed, this forest type can produce high-quality timber. Dominant species vary from northern red oak, white oak, and yellow-poplar on cool, moist, north- to east-facing slopes and those shaded by higher mountains to scarlet, chestnut, black oak, and hickory on hot, dry, west- to south-facing slopes. Major soils on warm aspects are Evard, Clifton, Cowee, Chestnut, Edneyville, Ashe, Junaluska, and Brasstown. Those on cool aspects are Porters, Unaka, Cheoah, Jeffrey, and Trimont soils.

Cove Hardwoods (SAF-57: Yellow-Poplar). This forest type is in coves and drainageways below about 4,800 feet in elevation. It has the potential to produce high volumes of wood per acre when compared with other forest types. The most common species is yellow-poplar. Stands also include northern red oak, white oak, black cherry, sweet birch, eastern hemlock, white pine, American basswood, yellow buckeye, and white ash. Above about 4,000 feet in elevation, yellow-poplar is less dominant and northern red oak, black cherry, white ash, sweet birch, yellow buckeye, yellow birch, and sugar maple are more common. Soils that commonly support this forest type include Tate, Northcove, Maymead, Toecane, Tusquitee, and Whiteside.

Northern Hardwoods (SAF-25: Sugar Maple-Beech-Yellow Birch). This forest type is on cool landscapes at elevations ranging from about 3,500 to 5,000 feet. Below an elevation of 4,200 feet, it is on north- to east-facing slopes or those shaded by the higher mountains. Above 4,200 feet, it is on side slopes and ridges on various aspects. On prominent ridgetops, on upper side slopes, and at elevations above 4,800 feet, trees exhibit slow growth and poor form due to frequent ice storms and high winds. Common species are northern red oak, mountain magnolia (Cucumber tree, Bigleaf, Umbrella, and Fraser), white ash, beech, sweet birch, yellow birch, black cherry, and sugar maple. A large percentage of the trees in this forest type are commercially valuable species. Major soils are Porters, Unaka, and Trimont on side slopes and Toecane and Tusquitee in coves. In areas underlain by metasedimentary rock, the major soils are Northcove and Maymead in coves and Cheoah and Jeffrey on side slopes. Above about 5,000 feet in elevation, the major soils include Burton, Craggey, and Wayah on side slopes and ridges and Tanasee and Balsam soils in coves. In areas underlain by metasedimentary rock, the major soils are Oconaluftee, Guyot, and Cataloochee on side slopes and ridges and Heintooga and Chiltoskie in coves.

Spruce-Fir (SAF-34 Red Spruce-Fraser Fir). This forest type is limited to landscapes above about 5,000 feet in elevation on the Craggy and Black Mountain Ranges and in the Mount Pisgah area. The present acreage is limited due to past fires, insect infestation, and management. Red spruce is now the dominant species. In recent years, the mature Fraser fir component has been severely damaged by infestations of the balsam woolly adelgid. However, there are many healthy Fraser fir seedlings and saplings in the understory. The population of red spruce is also in decline due to various climatic and environmental factors. Various heath and northern hardwood tree species are interspersed with this forest type. All species usually show poor form and stunted growth on landscapes exposed to high winds and severe climatic conditions. Soils that commonly support this forest type are Burton, Clingman, Craggey, and Wayah soils on side slopes and ridges and Tanasee and Balsam soils in coves. In areas underlain by metasedimentary rock, the major soils are Oconaluftee, Guyot, Cataloochee, Breakneck, and Pullback soils on side slopes and ridges and Heintooga and Chiltoskie soils in coves.

One of the first steps in planning intensive forestland management is to determine the potential productivity of the soil for several alternative tree species. The most productive and/or valued trees are then selected for each soil type. Site and yield information enables a forest manager to estimate future wood supplies. These estimates are the basis of realistic decisions concerning short- and long-term timber management goals, expenses and profits associated with intensive forestland management, land acquisition, or industrial investments.

The productive capacity of forestland in Buncombe County depends on physiography, soil properties, climate, and the effects of past management. Specific soil properties and site characteristics, including soil depth, texture, structure, and depth to the water table, affect forest productivity primarily by influencing the available water-holding capacity, aeration, and root development. The net effects of the interaction of these soil properties and site characteristics determine the potential site productivity.

Examples of past management decisions that limit productivity are overgrazing, severe erosion, and timber high-grading. These factors can affect forest health, vitality, species composition, and ultimately the quantity, quality, and value of the timber produced. The potential volume of wood produced by a stand of timber is not always the best indicator of the value of a site. Species composition and quality are as important as volume.

Naturally occurring site factors are also important to consider. The steepness and length of slopes and landform position affect water movement and availability. Elevation and aspect affect the amount of sunlight a site receives and the rate of evaporation. Sites on south-facing slopes are warmer and drier than those on north-facing slopes. The amount of rainfall and the length of growing season influence site productivity. While rainfall generally increases with elevation, productivity gains may be offset by the shorter growing season. All of these factors affect woodland productivity or the site index. The most productive sites are generally below 4,000 feet in elevation, on north- to east-facing slopes or those shaded by higher mountains, in sheltered coves, or in concave areas, such as benches, footslopes, and toeslopes (fig. 27). Most soils on these cool slopes have thicker A horizons and have more organic matter than soils on warm slopes. Porters, Cheoah, and Trimont are soils on cool side slopes. Tusquitee and Toecane are examples of soils on footslopes.

Map units of soils on warm slopes include minor components, such as areas in narrow, unmapped drainageways. These areas can produce yields higher than those indicative of the soil map unit as a whole. Map units of soils on cool slopes include minor components, such as areas on exposed spur ridges. These areas can produce yields lower than those indicative of the soil map unit as a whole. In either case, different tree species may occur in these areas of minor components.

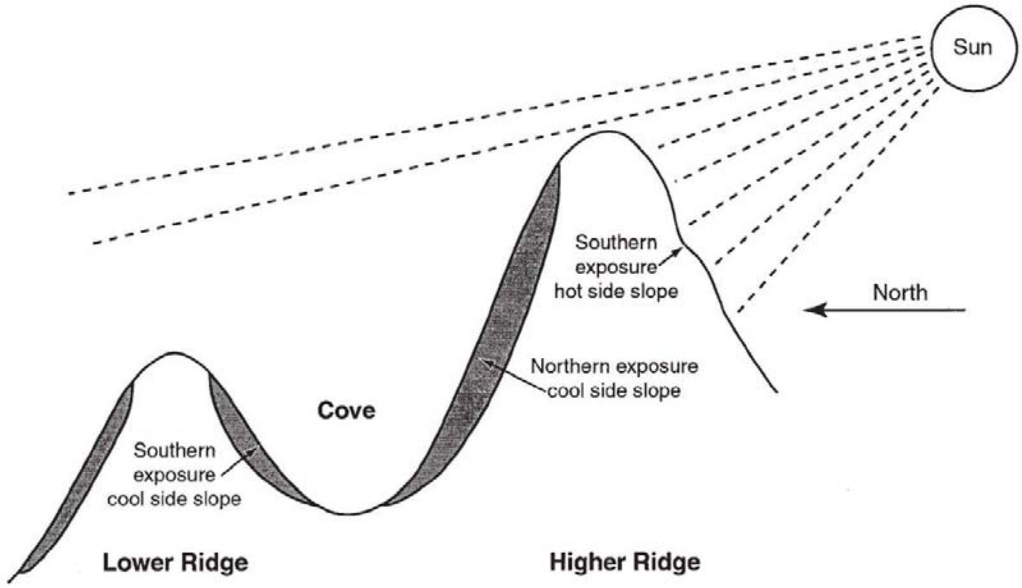

Figure 27.—Cool slopes include north- to east-facing slopes, those shaded by the higher mountains, and commonly those in coves. These areas are more productive but are susceptible to late spring and early fall frosts.

A knowledge of soils helps to provide a basic understanding of the distribution and growth of tree species on the landscape. For example, yellow-poplar grows well on deep or very deep, moist soils and scarlet oak or pine is common in areas where the rooting depth is restricted or the moisture supply is limited.

Availability of water, nutrients, parent material, and landform position largely determine which tree species grows on a particular soil.

Soil serves as a reservoir for moisture, provides an anchor for roots, and supplies most of the available nutrients. These three qualities are directly or indirectly affected by organic matter content, soil reaction (pH), fertility, drainage, texture, structure, depth, parent material, and landform position.

Elevation and aspect are of particular importance in mountainous areas.

The ability of a soil to serve as a reservoir for moisture, as measured by the available water-holding capacity, is primarily influenced by texture, organic matter content, rooting depth, and content of rock fragments or mica. Because of uneven patterns of summer rainfall in the survey area, the available water-holding capacity affects tree growth throughout most of Buncombe County. This is especially limiting on shallow and moderately deep soils, such as Cleveland, Ashe, Burton, Chestnut, Cowee, and Unaka soils (fig. 28). Lauada, Brownwood, and Micaville soils are examples of droughty soils that have a high mica content. For soils on steep uplands, much of the water movement during periods of saturation occurs as lateral flow downslope. As a result, soils on the lower slopes receive additional moisture due to internal waterflow.

Average precipitation values fluctuate throughout the survey area and can be divided into three general regions. The eastern and western sections are higher in elevation and average rainfall, while the central section of the county is lower in elevation and annual precipitation. The eastern and western sections range from 45 to more than 55 inches in average rainfall, while the central section is drier and ranges from less than 40 to 45 inches. In the extreme southwestern area, near Mt. Pisgah, and the eastern portion of the county, near Craggy Dome, average rainfall may exceed 60 inches. The north-central section, between the community of Jupiter and the forks

Figure 28.—Woodland productivity on shallow and moderately deep soils may be limited due to a thinner reservoir of soil moisture and a restricted root zone.

of the Ivy River, receives less than 40 inches of rain per year. This region has the lowest annual rainfall in North Carolina and one of the lowest on the East Coast.

Low precipitation in north-central Buncombe County is the result of a rain shadow. Prevailing weather patterns typically intercept mountain ranges west of the survey area. Rain shadows occur wherever moist air flowing over mountains causes precipitation to drastically increase on the windward side of the mountains and drop significantly less rain on the leeward side.

All soils in the survey area, except for the shallowest, provide an adequate anchor for tree roots. The susceptibility to windthrow, or the uprooting of trees by the wind, is not a major management concern on most soils. Soils that have a moderate or severe windthrow hazard include Ashe, Cataska, Chestnut, Cleveland, Cowee, Junaluska, Oteen, Soco, Sylco, Unaka, and Walnut.

The available supply of nutrients for tree growth is affected by several soil properties, including organic matter content of the surface layer. The decomposition of organic matter to humus and the mineralization of humus release nitrogen and other nutrients, such as calcium, magnesium, and potassium, to plants.

Natural fertility is also dependent on the soil parent material and local geology. Most upland soils have been leached and contain only small amounts of nutrients below the surface layer. Only small amounts of nutrients are made available by the weathering of clay and silt particles. In general, most of the soils in Buncombe County have good rooting depth, receive adequate rainfall, and are relatively productive. Exceptions are soils with a high mica content (Micaville and Brownwood soils) that are scattered throughout the south and eastern areas of the county and soils that formed over quartzite and metasandstone (Sylco and Cataska soils) in the Cane Creek and Upper Broad River areas of the county. These soils tend to produce lower quality timber.

The living plant community is also part of the nutrient reservoir. The decomposition

of leaves, stems, and other organic material recycles the nutrients that have accumulated in the forest ecosystem. Wildfire, excessive trampling by livestock, and erosion result in the loss of these nutrients. Forestland management should include prevention of wildfires, erosion-control measures, and protection from overgrazing (fig. 29).

This soil survey can be used to plan ways to increase and sustain the productivity of forestland. Some soils are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section “Detailed Soil Map Units,” the description of each map unit in the survey area and its suitability for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. **Table 9** summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in management.

In **table 9,** ratings of *erosion hazard* indicate the probability that damage will occur when site preparation or harvesting activities expose the soil. Forests that have been burned or overgrazed are also subject to erosion. Ratings are based on the percent slope. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Figure 29.—Wildfires result in the loss of topsoil and organic matter. Forestland management should include prevention of wildfires, erosion-control measures, and protection from overgrazing for nutrient enrichment of the forest ecosystem.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and susceptibility of the surface layer to compaction. As gradient of the slope and length increase, the use of wheeled equipment becomes more difficult. On the steeper slopes, tracked equipment is needed. On slopes steeper than 40 percent, helicopter or high lead cable logging systems are needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the best suited equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of the naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. A restricted rooting depth is the main reason for windthrow. The rooting depth can be restricted by a high water table, bedrock, or a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds break trees but do not uproot them; *moderate* if strong winds blow a few trees over and break many trees; and *severe* if moderate or strong winds commonly blow trees over. Ratings of moderate or severe indicate that care is needed in thinning or that the stand should not be thinned at all. Special equipment may be needed to prevent damage to restricted root systems in partial cutting operations. A plan for the periodic removal of windthrown trees and the maintenance of a road and trail system may be needed.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. Plant competition is more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants hinders adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants hinders natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A moderate or severe rating indicates the need for site preparation to ensure the development of an adequately stocked stand of the selected species. Managers should plan site preparation and maintenance measures to ensure timely reforestation.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a productivity number (*volume*). The predominant common trees are listed in **table 9**. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

For soils that are commonly used for timber production, the yield is predicted in cubic feet per acre per year. It is predicted at the point where maximum sustained growth rate occurs, or mean annual increment culminates. The estimates of the productivity of the soils in this survey are based mainly on eastern white pine, shortleaf pine, yellow-poplar, and northern red oak.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years (50 years in this survey). This index applies to fully stocked, even-aged, unmanaged stands. Site index may vary considerably among sites with the same soil because of the influence of past management, climate, relief, landform position, aspect, drainage, parent material, and elevation.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year. Cubic feet per acre can be converted to cubic meters per hectare by dividing by 14.3. It can be converted to board feet by multiplying by a factor of about 5. For example, a productivity class of 8 means that a soil can be expected to produce about 114 cubic feet per acre per year at the point where mean annual increment culminates, or about 570 board feet per acre per year.

Suggested trees to manage are those that are best suited for planting or, if appropriate conditions exist, natural regeneration. They are compatible with the soils and can produce a commercial wood crop. The short- and long-term timber management goals, landform positions of a site (cool versus warm aspect), and market value are several factors among many that can influence the choice of trees for use in reforestation.

Recreation

The National Park Service, Blue Ridge Parkway, United States Department of the Interior; Buncombe County Chamber of Commerce; and Buncombe County and Asheville City Parks and Recreation Departments helped prepare this section.

The soils in Buncombe County play an important role in determining the suitability for recreational uses, such as picnic and camping areas, parks, ball fields, and golf fairways. Knowledge of soils is valuable for managing areas that have the potential for recreational development. Buncombe County and the town of Asheville are popular tourist destinations and offer many outdoor activities and scenic vistas in a mountain setting.

Buncombe County offers diverse recreational opportunities. The town of Asheville occurs on intermountain hills, in coves, on terraces, and on flood plains. Common soils include Clifton, Evard, Tate, Unison, Dillard, and Biltmore. In contrast, the community of Alexander occurs on uplands, in coves, on flood plains, and in a river gorge. Common soils include Evard, Mars Hill, Walnut, Oteen, Tusquitee, Toecane, and Iotla. Where cut and fill occurs, Udorthents, loamy, and Udorthents-Urban land complex have been mapped. These areas contain restaurants, craft shops, shopping plazas, hotels and motels, churches, schools, movie theaters, and other public attractions. Golf fairways are in coves, on flood plains, on ridgetops, and on side slopes scattered throughout the Asheville Basin; greenways are dominantly on flood plains, in coves, and on terraces along major streams. Soils such as Tusquitee and Toecane occur in coves, and Porters and Edneyville soils occur on mountain side slopes. Access points for whitewater rafting and kayaking occur on flood plains where

Figure 30.—The French Broad River, a major recreational resource, traverses the county and parallels Biltmore, Rosman, French, Reddies, and Dellwood soils.

Biltmore, Iotla, Rosman, Reddies, and French soils are commonly found (fig. 30). Rural communities often have recreational areas developed on flood plains, in areas where French soils are common. Public festivals annually recognize arts and crafts, theater, the Fourth of July celebration, music, and mountain culture. The Mountain Dance and Folk Festival highlights Bascom Lamar Lunsford for his efforts to preserve the music, dance, and folklore of the Southern Appalachian Mountains.

Elsewhere in the county riding stables and trails, bed and breakfast inns, country clubs, private residences, and access roads are built in coves, on terraces, on intermountain hills, and on ridgetops and side slopes of low and intermediate mountains. Soils vary greatly depending on geology, aspect, and elevation but commonly include Evard, Mars Hill, Clifton, Edneyville, Walnut, and Porters soils on uplands and Tate and Tusquitee soils in coves. Rural communities often have recreational areas developed on flood plains where French soils commonly occur.

Pisgah National Forest makes up 31,461 acres in the Mount Pisgah, Bent Creek, and upper watersheds of the North Fork of Ivy, Dillingham, and Stony Creeks sections of the county. The most intensively used areas are the Powhatan Recreation Areas and the Pisgah Game Lands. The national forest offers picnicking, nature study, trails for hiking, bicycling, horseback riding, and a roadway for motor vehicles. The Mountains-to-the-Sea Trail traverses North Carolina's length and is the longest trail in Buncombe County. It is about 58 miles long and dominantly follows ridgetops from Mount Pisgah to the highest point in the county, Potato Knob (fig. 31).

Pisgah National Forest lands in Buncombe County are also used for hunting, fishing, and camping. They have been designated State Game Lands by the North Carolina Fish and Game Commission. Most waters in the Pisgah National Forest are also designated as trout streams and are very popular. The U.S. Forest Service allows back-country camping throughout the National Forest.

Soils in the National Forest vary in their ability to support recreational development. Soils on the intermediate and high mountains, such as Porters, Oconaluftee, and

Wayah, have thick surface layers with a high content of organic matter that are subject to compaction and severe erosion when disturbed by machinery or where trails are built. Cove soils such as Balsam and Toecane have a large amount of stones and boulders that limit recreational development. Because Ashe, Cleveland, Burton, and Craggey soils have bedrock near the surface and are associated with rock outcrops, they are limited for most recreational uses. The building of trails, access roads, and camp areas could require special design to overcome any site limitations.

The Blue Ridge Parkway diagonally traverses Buncombe County for about 52 miles and makes up approximately 6,115 acres of the county. The highest elevation, north of Asheville, near Blackstock Knob is 5,676 feet. The Parkway offers opportunities for hiking, picnicking, and sightseeing and access to Mount Mitchell State Park and Pisgah National Forest. Several trails originate from scenic overlooks along the parkway. Craggy Gardens is a developed recreational area along the parkway and offers seasonal interpretative programs and picnic areas. The Blue Ridge Parkway is managed by the National Park Service of the U.S. Department of the Interior.

The parkway provides access to coves, intermediate and high mountain ridgetops, and side slopes where the most common soils are Toecane, Tusquitee, Porters, Unaka, Chestnut, Ashe, Cleveland, Burton, and Wayah. All of these soils have unique properties that affect use and management for recreation.

Mount Mitchell State Park, North Carolina’s first State park, is located on the crest of the Black Mountain Range in Yancey County near the Buncombe County line. It is home to Mount Mitchell, which at 6,684 feet in elevation is the highest peak in the eastern United States. Wayah, Burton, Craggey, Clingman, Balsam, and Tanasee soils occur in this park and along the parkway to the Craggy Gardens and Mount Pisgah

Figure 31.—The Mountains-to-the-Sea Trail, a major recreational resource, crosses Porters and Unaka soils.

areas. Camping, picnicking, hiking, and nature study attract thousands of people each year to the park.

The soils of the survey area are rated in **table 10, parts I and II,** according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the table are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in **table 10** can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas.

The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic

areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Wildlife Habitat

Patrick Farrell, Wildlife Biologist, North Carolina Wildlife Resources Commission, and Matthew Flint, Biologist, Natural Resources Conservation Service, helped prepare this section.

Soils are a major factor in determining the amount and distribution of food, water, and cover available for wildlife. The many soils of Buncombe County help to form a diversity of wildlife habitat that can support many wildlife species. Soils affect the kind and amount of vegetation available to wildlife as food and cover. They also affect the construction of water impoundments and the presence of seeps and springs.

Knowledge of soil types and the plant communities that they support is valuable in managing wildlife. Generally, wildlife occupies the soils that are the most suitable for their habitat, meeting food, water, and cover requirements. Yet, soils that have a good potential for wildlife do not always support a large population of wildlife. Human activities can force wildlife onto soils that support less desirable habitat. This can adversely affect the kinds and numbers of wildlife.

Understanding soil-vegetation relationships is important in creating and maintaining productive wildlife habitat areas. Soil surveys can be used in management programs, such as habitat improvement, species reintroduction, and creation of wildlife refuges. A variety of habitat for a variety of wildlife is an important objective in wildlife management. The needs of wildlife habitat should be considered in all decisions involving land use and management.

The soils of the county support vast areas of woodland wildlife habitat. Many areas of woodland are immature mixed hardwoods that produce a variety of hard and soft mast. Black bear, turkey, gray squirrel, and woodpeckers, in particular, benefit from

such habitat. On the warm south- to west-facing aspects, Edneyville, Evard, Mars Hill, and Stecoah soils provide food and cover, such as oaks, hickory, dogwood, pine, and mountain laurel. Soils on the cooler north- to-east facing aspects, such as Porters and Unaka, support a plant community consisting of yellow-poplar, American beech, black cherry, and rhododendron. Areas of Ashe and Cleveland soils and rock outcrop support many varieties of lichens, grasses, and forbs. The many twisted and dead trees associated with these areas serve as important den and nesting places for woodland wildlife. The remoteness of these areas also provides refuge for wildlife.

The availability of water and cover are key elements in wildlife habitat. Soils in coves, such as Toecane, Tusquitee, Tate, Heintooga, and Chiltoskie, have a cool, moist environment and frequently have seeps, springs, or streams. Boulders, stones, or dense thickets of rhododendron on these soils also provide cover for wildlife. Raccoon and ruffed grouse frequent these areas for food and cover. Salamanders and other amphibians benefit from the moisture in the coves. Soils in coves on warm south- to west-facing aspects contribute to wildlife habitat by providing moisture and a diversity of plants to an otherwise uniform plant community.

Woodland wetlands along the larger rivers and streams contribute to habitat diversity. Uncleared Biltmore, French, Dellwood, and Reddies soils host wetland inclusions. These areas support dense plant cover. A variety of wildlife utilizes these areas.

The cool-water streams of the county support brook, brown, and rainbow trout. The French Broad River has populations of smallmouth bass, walleye, and muskellunge. Largemouth bass, bluegill, crappie, and other sunfish are dominant in warm-water ponds.

The severe climate at high elevations limits the potential for diversity among tree species. Soils such as Wayah, Burton, Oconaluftee, and Heintooga support yellow birch, sweet birch, and northern red oak. They also support small stands of red spruce and Fraser fir where red squirrel and several less common species of salamander are found. The soils at high elevations support many varieties of soft mast, forbs, and grasses, especially on balds and in open areas. Black bear, ruffed grouse, and deer utilize these areas. Hawks and other birds of prey use the open areas for hunting.

The size and remoteness of the habitat at the higher elevations is critical in some wildlife management programs. These areas are becoming increasingly important to species that require large tracts of habitat, such as black bear. The unique grassy balds in areas of Wayah, Burton, Oconaluftee, Guyot, and Cataloochee soils provide open areas to wildlife. Shallow, rocky crags in areas of Burton, Craggey, Breakneck, and Pullback soils and areas of rock outcrop have already served as suitable habitat for the reintroduction of the endangered peregrine falcon.

Many open areas are the result of human activities. Generally, open spaces in the county occur mainly on the less slopping landscapes at the lower elevations. The complex soil and vegetation patterns associated with these open areas can provide the most habitat diversity when suitable woodland cover is nearby (fig. 32). These are also used for a variety of human activities, including agricultural, residential, industrial, and recreational development. Most of these activities preclude use of the land by many wildlife species.

Wildlife, especially large game, is forced to move to less desirable soils which support less desirable habitat and thus, smaller wildlife populations. Soils that have good potential for providing wildlife habitat do not necessarily support a viable wildlife population. For example, Rosman, Tate, Evard, and Clifton soils have good potential as habitat for wildlife. However, these soils are intensively used for farming and housing, forcing wildlife elsewhere. Other soils, such as Mars Hill and Edneyville, also have good potential as habitat for wildlife. Most of the acreage these soils occupy is in woodland. However, cattle are often given access to woodlands and are very competitive with wildlife for food.

Figure 32.—High mountain summer pasture in an area of Oconaluftee-Guyot-Cataloochee complex, windswept, 15 to 30 percent slopes, bouldery. Open areas such as these provide good habitat diversity for wildlife.

Wildlife habitat can be created and improved by planting vegetation, by maintaining existing plant cover, or by promoting the natural establishment of desirable plants. In open areas, soil conservation measures, such as field borders and vegetative filter strips provide the needed food and cover. Establishing plant cover along access roads helps to provide food for wildlife and assists in preventing the sedimentation of lakes and streams.

Many woodland management techniques can be used to increase the potential for wildlife habitat. Openings in the forest canopy encourage plant diversity and growth and subsequently increase the potential wildlife habitat for many species. In timber or firewood cutting areas, some snags and older trees should be left to provide for cavity nesters, such as woodpeckers, and to provide den sites for raccoons and squirrels. Unusually large trees, uncommon tree species, and some mast-bearing trees and shrubs should also be left. Keeping well dispersed groups of different-aged timber stands with a variety of tree species in every stand is a key to overall benefits for wildlife.

Engineering

Howard Tew, Civil Engineer, Natural Resources Conservation Service, helped prepare this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the “Soil Properties” section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally

apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water-holding capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are described in the Glossary.

The soils in Buncombe County occur on a variety of landforms, from flood plains and gently sloping terraces to mountaintops more than 6,000 feet above sea level. The soils in Buncombe County are used for a wide range of purposes, from burley tobacco production to construction of multi-unit housing. Soils in many areas may be easily developed using conventional engineering design techniques. Others require specialized engineering and construction techniques to overcome their inherent limitations. In planning any engineering activity, the limitations of the soils must be considered if construction problems are to be avoided. The tables in this survey can help to evaluate the soil limitations at potential construction sites.

In order to effectively evaluate soils for engineering or construction purposes, the factors which limit a soil's use must be considered. In Buncombe County, there are a number of soil-site characteristics which pose engineering difficulties. Among the most important are slope, erodibility, instability (poor bearing strength or shear strength), shrink-swell potential, stoniness, depth to bedrock, freeze-thaw cycle, hydrology, and organic matter content.

Slope.—In Buncombe County, slopes range from 0 to more than 95 percent. Most soils are on slopes of more than 15 percent. The steeper the slope the greater the limitation it is. As slope increases, access roads require higher cut faces and longer fill slopes, buildings require stronger foundations, and septic tank filter fields need special design. Some soils may be unsuitable for development because of the slope.

Figure 33.—Sediment basins should be installed before land-disturbing activities begin. They keep eroding soil onsite and help to maintain water quality.

Rainfall runoff from steep watersheds results in high peak rates and flow velocities in receiving streams. Water flow and impoundment structure design must meet exacting standards in order to control the high runoff from these watersheds. Ponds, sediment basins, and waterways are likely to be damaged or may wash out if construction design does not address the complications of steep slopes. Downstream damages and subsequent liability should a failure occur are the consequences of a poor design.

Erodibility.—Erosion control on steep slopes presents a unique challenge. During construction, surface cover is removed, exposing soil to erosion. Piles of soil around a construction site have no resistance to erosional forces. Whenever runoff is allowed to accumulate and move across construction sites uncontrolled, severe erosion occurs. Excavations on sloping mountain soils result in severe erosion and offsite sediment damage unless adequate erosion-control measures are taken (fig. 33).

Cuts on mountainsides generally result in high fills with steep and very steep slopes. Construction which requires significant cuts and fills on mountain side slopes needs careful erosion control. Typically, fill slopes consist dominantly of saprolite and rock fragments. Saprolite can be very erosive, droughty, infertile, and very strongly acid to extremely acid. These characteristics make it difficult to stabilize the slope with vegetation.

Fill slopes for which compaction is not carefully monitored and controlled usually have low density and high porosity. As water moves through a fill slope, settling occurs. As the pores fill with water, the fill slope gets heavier. This causes piping, differential settling, severe slope failure, and offsite sediment damage. Generally, micaceous soils are underlain by micaceous saprolite. Also, soils with a low mica content are commonly underlain by micaceous saprolite. Fill slopes containing micaceous saprolite have slope failure at a lower water content than fill slopes that do not contain a high amount of mica.

Instability.—In order to support loads, such as high fills, buildings, or vehicular traffic, undisturbed soils must possess an inherent bearing strength. Undisturbed sloping soils must also provide a degree of shear strength in order to support their

Figure 34.—Soils with higher amounts of mica tend to have a slick, greasy feel and a shiny sparkle when viewed in full sunlight.

own weight. Additional loading puts a greater stress on the soil. When loading stresses exceed bearing strength or shear strength, soils move unpredictably. Loading stresses exceed bearing strength or shear strength more quickly on micaceous soils or soils derived from metasedimentary rock than on other soils. Any excavation cut across the slope of these soils removes the lateral support holding the soil back. In time the weight of the soil above the cut may cause downslope movement, which damages roads and structures.

Soils, like machinery, move more freely when lubricated. Such lubrication of soils occurs where high concentrations of mica exist in the soil. Mica can be detected by a slick greasy feel and by a shiny sparkle in soil when struck by the sun or other bright light (fig. 34). Water also is a soil lubricant. When soil becomes saturated with water it tends to move away from the loading forces applied to it. Whether lubricated by natural soil particle characteristics or by water, soil that moves provides very little shear strength. Areas of micaceous soils or soils subject to seeps and springs are poor choices for construction sites due to poor strength manifested by downslope movement. Fannin soils are unstable due to their high mica content. Soils in coves and on toeslopes, such as Tate, Tusquitee, Northcove, Maymead, and Toecane, contain seeps and springs.

Landscapes in northwestern and southeastern Buncombe County are unstable because of their metasedimentary geologic origin. Soils in these areas include Junaluska, Brasstown, Soco, Stecoah, Sylco, Cataska, Oconaluftee, Guyot, and Cataloochee. The underlying rock lies in layers which run approximately parallel to the natural land slope. This rock structure provides very little shear strength and tends to slide when loaded. Soil particles weathered from these rocks tend to be flat, allowing them to slip when wet. Any excavation cut across the slope of these soils removes the lateral support holding the soil back. In time the weight of the soil above the cut may cause downslope movement, which damages roads and structures.

On flood plains dominantly along the French Broad River, the Broad River, Cane Creek, Hominy Creek, and Reems Creek, Rosman, Iotla, and Biltmore soils occur. These soils are composed predominantly of fine to coarse sands and silts. They have little natural plasticity and may become unstable when excavated. The soil particles are not bound together by an adhesive of clay and will flow when subjected to excessive loading while wet. Excavations in such soils are difficult and can be dangerous. In addition, side walls tend to cave in and slough off when lateral support is removed. Extensive shoring of excavation pits and walls is needed if cave-ins are to be prevented.

Shrink-swell potential.—Unison soils on terraces and in coves in Buncombe County have a type of clay that has a moderate shrink-swell potential. Shrinking and swelling causes soil to push against foundations and buried pipes. Over time foundations crack and pipes break. Special planning and design of footings, foundations, and underground utilities may be required before construction begins.

Stoniness.—Most mountain soils contain rock fragments. These fragments range in size from gravel to boulders. Soils are classified as skeletal when 35 percent of their volume is rock fragments. Skeletal soils are limited for engineering uses due to the rock content and need special design to overcome the limitations. Cove soils, such as Northcove and Toecane, are skeletal. Other cove soils, such as Tate, Whiteside, and Keener, have fewer stones in the profile. Flood plain soils are underlain by smooth, water-rounded rock ranging from fine gravel to boulders. Dellwood soils are skeletal beginning at a depth of 10 to 20 inches. Reddies and French soils have 20 to 40 inches of non-skeletal soil above the skeletal layer. The skeletal layer in Rosman and Biltmore soils is even deeper.

The stone content of residual soils in Buncombe County, such as Edneyville, Evard, Chestnut, Walnut, and Junaluska, varies from only a few rock fragments to as much as 35 percent of the soil volume. A soil can vary in rock fragment content from place to place in the county and even within the soil profile.

Construction and development requires compaction of fill material to provide firm foundations and impervious layers. Excess rock fragment content in fill material inhibits compaction. Unacceptable settlement is likely to occur, resulting in damage to buildings, structures, and roads. Compaction of rocky soils fails to produce the homogenous density required in the construction of earth dams and other water-retention structures. Shallow excavations and fine grading may be difficult in excessively stony soils.

When analyzing soils for engineering purposes, rock fragment content should receive special emphasis. Always consider that the Unified Soil Classification System (USCS) evaluates textures only for that fraction of the soil passing the No. 200 sieve (grain size 0.074 millimeter and less). The USCS texture for a specific soil may be shown as SC (sand with clay fines) or CL (low plastic clay), which indicates that the soil is ideal for fill material and will respond acceptably to compaction. The soil, however, may contain rock fragments too large to pass the No. 200 sieve, and this could render the soil unsuitable for use as fill. Consult the pedon description in the “Classification of Soils” section of this soil survey for evidence of excessive stoniness. An onsite investigation may be necessary in order to determine actual conditions *(4)*.

Depth to bedrock.—Hard bedrock is at a depth of 10 to 40 inches in Ashe, Cleveland, Unaka, Burton, and Craggey soils. Hard bedrock is indicated in the pedon descriptions in the “Classification of the Soils” section by the horizon designation “R”. Chestnut, Cowee, Lauada, Walnut, and Junaluska soils have weathered bedrock at a depth of 20 to 40 inches. Stecoah, Micaville, and Brasstown soils have weathered bedrock at a depth of 40 to 60 inches. Weathered bedrock is indicated by the horizon designation “Cr” *(4)*.

Hard bedrock cannot be excavated with machinery unless it is highly fractured. Weathered bedrock can be excavated with machinery. The relative hardness of

weathered bedrock generally increases as depth increases. Soft, weathered bedrock which is easily excavated at a depth of 4 feet may become hard and unrippable at a depth of 8 feet. The surfaces of these restrictive features are undulating below the soil, and onsite investigations are needed to determine the topography before construction begins. Material excavated from weathered bedrock layers is dry, brittle, and hard to pack.

Freeze-thaw cycles.—Soils in Buncombe County located on south- and west-facing slopes are exposed to continual freezing and thawing from November to March. Soils such as Evard, Cowee, Fannin, Junaluska, Brasstown, and Clifton are susceptible to frost heaving. Frost action loosens the surface of the soil and heaves it above its normal position. Subsequent thawing may leave the soil surface in a near liquid state. In this condition the soil is subject to erosion and has little load-supporting strength. Unprotected slopes experience erosion, and access roads become impassable. At times a thaw may not affect all of the frozen soil. When this happens an unfrozen, heaved layer of soil is on top of frozen soil. Severe erosion can occur when soil is in this condition as water moves across the top of the frozen soil. A soil surface cover like mulch, vegetation, or gravel can minimize the effects of freezing and thawing.

Frost heaving exerts considerable force on footings and foundations located on susceptible soils. Design of structures must consider potential frost heave damage. Frozen soil resists compaction and should not be used in fill material when compacted densities are important. Depth of frost penetration varies with elevation and aspect across the county. Soils on north-facing slopes develop frost to greater depths than soils on south-facing slopes but do not cycle as often. Frost penetration may exceed 24 inches in some years at the higher elevations in Buncombe County.

Hydrology.—Soil water affects most all other engineering characteristics of soils already discussed. However, water by itself can limit engineering uses of soils in many ways. Dellwood, Reddies, French, Nikwasi, Rosman, and Biltmore soils occur on flood plains. Nikwasi soils flood frequently, and the rest flood occasionally. Dillard, Hemphill, and Statler soils are on low terraces that flood rarely. Any structure may be damaged in a flood. It is best not to use these areas for urban development except possibly for ball fields and playgrounds.

Tusquitee, Toecane, Tate, and Unison soils in coves and Dillard and Hemphill soils on low terraces have seeps and springs underground or at the surface. Excavations in these soils may cut into underground water flows, thus flooding the hole. Special engineering design is needed to divert the water away from the structure.

Overland flow is a serious water problem on mountain land. Any access road, building, or other structure developed on a mountainside requires a design that diverts surface runoff.

French, Rosman, Reddies, and Dellwood soils have water tables that are close enough to the soil surface to be a limitation to development. Since these soils flood, land use should be limited to agricultural and recreational uses.

Organic matter content.—Wayah, Burton, Oconaluftee, Guyot, Cataloochee, Heintooga, Chiltoskie, Porters, Unaka, Tusquitee, Toecane, Rosman, Dellwood, and Reddies soils have a high organic matter content in the surface layer that causes low strength when used to bear loads. Access roads and construction sites where equipment moves across the surface of these soils are of low quality unless the topsoil is removed or surfaced. It is best to remove the organic rich topsoil and stockpile it for use during the final grading before allowing machinery to travel across the land.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. **Table 11, parts I and II,** show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible

material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Access Roads

Establishing and maintaining access roads in the survey area has always been difficult. Sedimentation from roads is the largest source of non-point pollution in the survey area. A new road is often built along the path of an old one and past errors are repeated. Currently, road construction in the mountains is at an unprecedented high level. Landowners are reopening old roads to provide access to woodlots and intermittently used farmland. Roads are opened or built each year for logging on private and government-owned lands. The largest effort in road construction, however, is to provide access to real estate developments. In all of these situations, the design of a low-cost, nonpolluting, and essentially self-maintaining road is needed (fig. 35).

The U.S. Forest Service has supported research and demonstrations on design for forest access roads for more than 50 years at the Coweeta Hydrologic Laboratory in the Nantahala Mountains in Macon County, North Carolina. Early work demonstrated methods of roadbank stabilization that use brush and native grasses or weed species. Through a series of logging demonstrations, the design of a minimum standard, intermittent-use road was developed and tested. Features of this design apply to both seldom used and development access roads and are as follows:

1. Soils and geology are identified on maps, and site selection or construction practices, or both, are modified where unstable conditions are located.
2. All exposed soil is revegetated as construction proceeds.
3. The siltation of permanent and intermittent streams is reduced by maintaining a filter strip of undisturbed soil between the road and the stream channel and by building at right angles across channels, always using bridges, open pipe, or stream-crossing fords with geotextile and gravel.
4. Vegetation and brush that are cut from the right-of-way are piled below the roadway prior to construction. This barrier intercepts sediment-laden storm water or slows its movement downslope.

Figure 35.—A well designed, constructed, and properly maintained access road minimizes soil erosion and allows year-round use.

5. A covering is provided for loose soil in fills to help control erosion at critical points, such as stream crossings and dip outlets. Mulch netting or scattered branches, brush, cut weeds, or grass help to protect the soil until new grass is established.

6. Surface water is removed from the roadbed by out-sloping and broad-based dips and inside ditches. (In-sloped roads with ditches and culvert ditches are recommended by NRCS for heavily used areas.)

7. Broad-based dips, which are short sections of reverse grade, intercept storm water and divert it off the roadbed. Dips are spaced about 200 feet apart and placed where they can divert water away from stream crossings or steep grades.

8. Maximum grade is restricted to 8 percent wherever possible.

9. Where roadbeds are not graveled, grass is planted on the entire roadway. Although traffic may kill grass in part of the roadbed, the rest of the roadbed will remain protected against erosion. Gravel is used on the steeper grades, on problem soils, or in high-traffic areas. Large, washed rock (3 inch nominal diameter) provides an effective erosion-control pavement on light-traffic roads. Gravel bonds best to the roadbed if it is added immediately after construction, when the soil is loose.

10. Required maintenance for access roads is increased by traffic in winter and early spring, when the soils are wet and soft. If traffic can be controlled, the annual mowing of grass and brush, supplemented by the periodic cleaning of dip outlets, may be the only maintenance needed. Areas of greater traffic may require that the roadbed be smoothed every 5 to 10 years and the grass and gravel replaced. Areas of heavy year-round traffic require that the road be upgraded and receive scheduled maintenance.

The road design developed and tested at Coweeta Hydrologic Laboratory has influenced Federal, State, and forest industry guidelines and has helped to minimize erosion and the impact on water quality.

In 2005, the Natural Resources Conservation Service published the booklet “The

Layman's Guide to Private Access Road Construction in the Southern Appalachian Mountains," second edition. (Available at http://www.hrwc.net/laymans_guide_to_access_road.pdf.) This booklet provides information to home builders and developers on building access roads while minimizing cost and environmental impact. One should consider the detailed information given in the description of each soil in the section "Detailed Soil Map Units" and in the tables. More specific information can be obtained from the local office of the Natural Resources Conservation Service or the Buncombe Soil and Water Conservation District.

Sanitary Facilities

Table 12, parts I and II, show the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. The animal waste lagoons commonly used in farming operations are not considered in the ratings. They are generally deeper than the lagoons referred to in the table and rely on anaerobic bacteria to decompose waste materials.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil

properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope or bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in **table 12** are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affects both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13, parts I and II, give information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In **table 13**, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness

of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale, siltstone, and weathered granite saprolite, are not considered to be sand and gravel.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface layer and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the high water table is more than 3 feet. Soils rated *fair* have more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the high water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a high water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a high water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a high water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They

are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area. Ponds that are less than about 2 acres in size are not shown on the maps because of the scale of mapping.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, mica, or salts or sodium. Depth to a high water table affects the amount of usable material. It also affects trafficability.

Soils that have a high content of mica, such as Fannin soils, are poorly suited to use in the construction of embankments. The problems resulting from the high content of mica include difficulty in compaction, poor trafficability, susceptibility to erosion, and low shear strength. Also, piping commonly is a problem if the soil material is used to impound water.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed

only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Index Properties

Table 15 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. “Loam,” for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, “gravelly.” Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional

refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Physical and Chemical Properties

Table 16 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In **table 16**, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability (K_{sat}) refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in inches per hour,

when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In **table 16**, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in **table 16** as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Soil Features

Table 17 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness of the restrictive layer, which significantly affects the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Soil slippage potential is determined by the observation of surface slippage features that indicate a mass of soil will possibly slip when the vegetation is removed and soil water is at or near saturation or when the slope is undercut. Saturating a slope with water from altered drainage or irrigation has an effect on slippage. Soil slippage potential is an important consideration for engineering practices, such as constructing roads and buildings, and for forestry practices.

Soil slippage potential classes are estimated by observing slope; lithology, including contrasting lithologies; strike and dip; surface drainage patterns; and occurrences of such features as slip scars and slumps. The following classes are used: high (unstable), medium (moderately unstable), and low (slightly unstable to stable).

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Water Features

Table 18 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when

thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. **Table 18** indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. **Table 18** indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(20, 22)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. **Table 19** shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, parasesquic, mesic Typic Hapludults.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows

standards in the “Soil Survey Manual” *(21)*. Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” *(20)* and in “Keys to Soil Taxonomy” *(22)*. Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series. The map units of each soil series are described in the section “Detailed Soil Map Units.”

Ashe Series

Depth class: Moderately deep
Drainage class: Somewhat excessively drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock, such as granite and biotite gneiss
Landscape: Low and intermediate mountains in the eastern and western parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Ashe sandy loam in an area of Ashe-Cleveland-Rock outcrop complex, 15 to 30 percent slopes, very stony (fig. 36); Buncombe County, North Carolina; from Asheville, 5.1 miles east on Interstate 240, about 12.2 miles east on Interstate 40 to Black Mountain and take Exit #64, about 11.9 miles south on North Carolina Highway 9, about 3.2 miles southeast on Secondary Road 2796, about 0.9 mile north on a private road, 0.5 mile northeast on a logging road, 20 feet above the road near the Buncombe-Rutherford County line, on a forested upper side slope; Moffitt Hill USGS topographic quadrangle; lat. 35 degrees 30 minutes 47 seconds N. and long. 82 degrees 14 minutes 00 seconds W.; NAD27:

Oe—0 to 2 inches; moderately decomposed organic litter and root mat.
A1—2 to 5 inches; very dark gray (10YR 3/1) sandy loam, dark yellowish brown (10YR 4/4) dry; weak fine granular structure; very friable; many very fine and fine and few medium roots; few very fine and fine pores; few fine flakes of mica; 15 percent, by volume, gravel and 5 percent cobbles; very strongly acid; clear smooth boundary.
A2—5 to 7 inches; very dark grayish brown (10YR 3/2) gravelly fine sandy loam, dark yellowish brown (10YR 4/4) dry; weak fine granular structure; very friable; many very fine and fine and few medium roots; few very fine and fine tubular pores; few very fine and fine flakes of mica; 15 percent, by volume, gravel and 5 percent cobbles; very strongly acid; clear smooth boundary.
Bw—7 to 23 inches; dark yellowish brown (10YR 4/6) gravelly sandy loam; weak fine subangular blocky structure; friable; few fine and medium and common coarse roots; few very fine, fine, and medium pores; few very fine and fine flakes of mica; 15 percent, by volume, gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.
BC—23 to 29 inches; yellowish brown (10YR 5/4) gravelly sandy loam; weak medium subangular blocky structure; friable; few medium and coarse roots; few very fine tubular pores; few fine flakes of mica; 20 percent, by volume, gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.
Cr—29 to 34 inches; weathered, strongly cemented biotite gneiss; high excavation

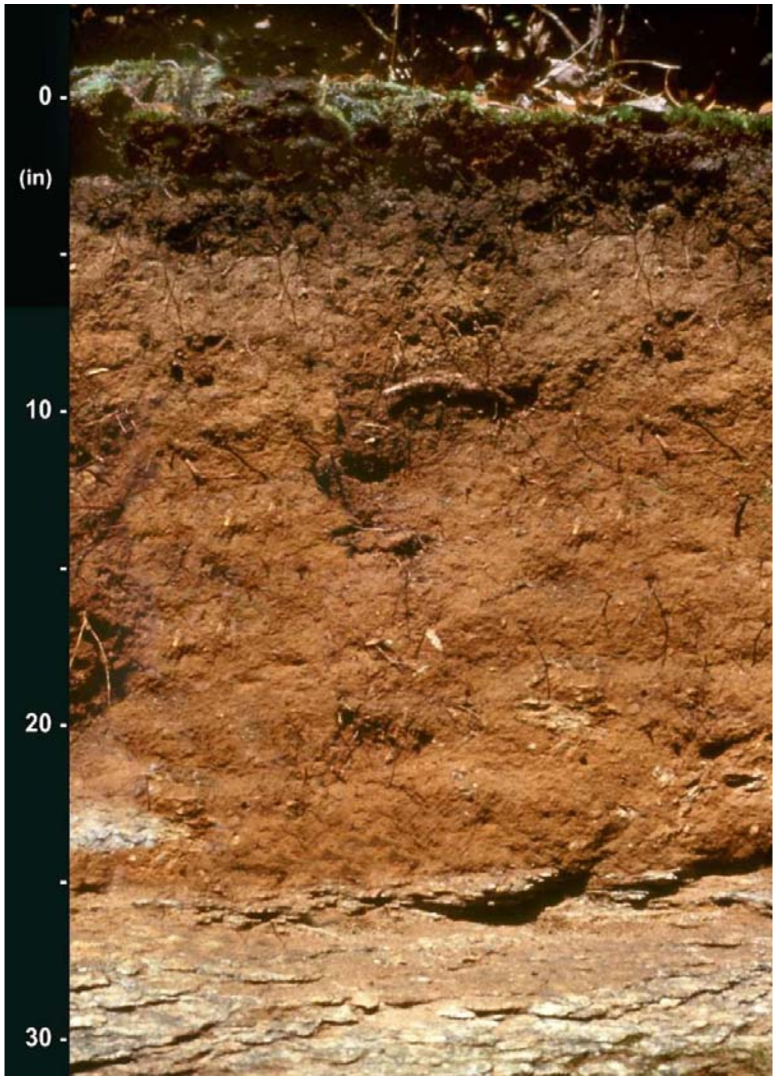

Figure 36.—Typical profile of Ashe sandy loam. Ashe soils are moderately deep to unweathered hard bedrock. They occur on low or intermediate mountains in the eastern and western parts of Buncombe County

difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; abrupt smooth boundary.

R—34 to 80 inches; unweathered, hard biotite gneiss bedrock.

Range in Characteristics

Solum thickness: 14 to 40 inches
Depth to bedrock: 20 to 40 inches to hard bedrock
Content of mica flakes: Few or common
Content and size of rock fragments: 5 to 35 percent, by volume; dominantly gravel but including cobbles and stones
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:

Color—hue of 7.5YR to 2.5Y, value of 2 to 6, and chroma of 1 to 6; where value is 3 or less, the horizon is less than 7 inches thick

Texture (fine-earth fraction)—fine sandy loam, sandy loam, loam, or coarse sandy loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—sandy loam, coarse sandy loam, fine sandy loam, or loam

BC horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—sandy loam, coarse sandy loam, fine sandy loam, loam, loamy sand, or loamy fine sand

C horizon (if it occurs):
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loamy coarse sand, loamy sand, loamy fine sand, coarse sandy loam, sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, felsic or mafic high-grade metamorphic or igneous rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, felsic or mafic high-grade metamorphic or igneous rock
Excavation difficulty—very high or extremely high

Balsam Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Colluvium derived from materials weathered from high-grade metamorphic rock on the Pisgah and Craggy Mountains
Landscape: High Mountains in the Mt. Pisgah, Craggy Garden, and Potato Knob parts of the county
Landform: Coves, drainageways, and colluvial fans
Landform position: Head slopes, footslopes, and toeslopes
Slope range: 15 to 50 percent
Taxonomic classification: Loamy-skeletal, isotic, frigid Humic Dystrudepts

Typical Pedon

Balsam cobbly loam in an area of Balsam-Tanasee complex, 15 to 30 percent slopes, extremely bouldery; Yancey County, North Carolina; from Burnsville, 4.0 miles east on U.S. Highway 19E to Micaville exit, 14.2 miles south on North Carolina Highway 80S, about 11.4 miles south on Blue Ridge Parkway, 2.2 miles north on North Carolina Highway 128, about 1.1 miles northeast on an unmarked gravel road, 0.2 mile north on the unmarked gravel road, 100 feet south of a water tank in a forested cove; Mt. Mitchell USGS topographic quadrangle; lat. 35 degrees 45 minutes 32 seconds N. and long. 82 degrees 16 minutes 03 seconds W.; NAD27:

Oi—0 to 1 inch; slightly decomposed organic litter and root mat.

A1—1 to 6 inches; black (10YR 2/1) cobbly loam, very dark grayish brown (10YR 3/2) dry; weak fine granular structure; very friable; many very fine to medium and common coarse roots; many very fine and fine and common medium and coarse tubular pores; few very fine and fine flakes of mica; 5 percent, by volume, gravel and 15 percent cobbles; extremely acid; abrupt smooth boundary.
A2—6 to 12 inches; very dark brown (10YR 2/2) cobbly loam, very dark grayish brown (10YR 3/2) dry; weak fine granular structure; very friable; many very fine to medium roots; many very fine and fine and common medium and coarse tubular pores; few very fine and fine flakes of mica; 10 percent, by volume, gravel and 20 percent cobbles; very strongly acid; clear wavy boundary.
BA—12 to 21 inches; dark brown (7.5YR 3/4) very cobbly fine sandy loam; weak fine granular structure; very friable; common very fine and fine and few medium and coarse roots; common very fine to medium tubular pores; few very fine and fine flakes of mica; 10 percent, by volume, gravel, 35 percent cobbles, and 1 percent stones; very strongly acid; clear wavy boundary.
Bw1—21 to 35 inches; dark yellowish brown (10YR 4/6) very cobbly loam; weak medium subangular blocky structure; firm; common very fine and fine and few medium pores; common very fine and fine flakes of mica; 10 percent, by volume, gravel, 40 percent cobbles, and 1 percent stones; very strongly acid; clear wavy boundary.
Bw2—35 to 43 inches; dark yellowish brown (10YR 4/6) very cobbly loam; weak medium subangular blocky structure; firm; few very fine tubular pores; common very fine and fine flakes of mica; 10 percent, by volume, gravel, 45 percent cobbles, and 1 percent stones; very strongly acid; clear wavy boundary.
C—43 to 80 inches; 55 percent strong brown (7.5YR 4/6) and 45 percent dark yellowish brown (10YR 4/6) very cobbly sandy loam; massive; firm; few fine flakes of mica; 5 percent, by volume, gravel, 50 percent cobbles, and 1 percent stones; very strongly acid.

Range in Characteristics

Solum thickness: 40 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common
Content and size of rock fragments: 20 to 90 percent, by volume; ranging from gravel to boulders and typically increasing with depth
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 0 to 3
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or coarse sandy loam
Thickness—10 to 20 inches

BA horizon:
Color—hue of 7.5YR to 2.5Y, value of 3 or 6, and chroma of 4 to 8
Mottles—shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loamy coarse sand, loamy sand, loamy fine sand, coarse sandy loam, sandy loam, fine sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—coarse sandy loam, sandy loam, fine sandy loam, or loam

BC horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8

Texture (fine-earth fraction)—coarse sandy loam, sandy loam, fine sandy loam, or loam

C horizon:

Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8

Texture (fine-earth fraction)—loamy coarse sand, loamy sand, loamy fine sand, coarse sandy loam, sandy loam, or fine sandy loam

Biltmore Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: 3.5 to 6.0 feet from December through May and 4.0 to 6.5 feet from June through November
Permeability: Rapid
Parent material: Recent sandy alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountains valleys of intermountain hills; low and intermediate mountains, dominantly along Cane, Hominy, Reems, and Newfound Creeks and the French Broad and Swannanoa Rivers
Landform: Flood plains
Landform position: Planar to slightly convex bottomland slopes
Slope range: 0 to 3 percent
Taxonomic classification: Mixed, mesic Typic Udipsamments

Typical Pedon

Biltmore loamy sand, 0 to 3 percent slopes, occasionally flooded (fig. 37); Buncombe County, North Carolina; from Asheville, 3.8 miles east on Interstate 240 West to Exit 1B (Brevard Road, North Carolina Highway 191), 1.7 miles south on North Carolina Highway 191, about 0.5 mile southeast on Biltmore Estate farm road, 1.5 miles northeast (left at barn) on Long Valley farm road to the French Broad River, 0.1 mile east along the farm road, 240 feet south in a cultivated field; Asheville USGS topographic quadrangle; lat. 35 degrees 32 minutes 39.2 seconds N. and long. 82 degrees 34 minutes 23.9 seconds W.; NAD27:

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) loamy sand, pale brown (10YR 6/3) dry; few medium distinct brownish yellow (10YR 6/6) mottles; weak fine granular structure; very friable; many very fine, fine, and medium roots throughout; few fine interstitial pores; common very fine and fine flakes of mica; slightly acid; abrupt smooth boundary.

C1—8 to 16 inches; brownish yellow (10YR 6/6) sand; few medium distinct very pale brown (10YR 7/3) mottles; single grain; loose; few very fine, fine, and medium roots; few fine interstitial and tubular pores; few fine black (10YR 2/1) charcoal stains; common very fine and fine flakes of mica; slightly acid; clear smooth boundary.

C2—16 to 23 inches; yellowish brown (10YR 5/6) sand; few medium faint yellowish brown (10YR 5/4) mottles; single grain; loose; few very fine and fine roots throughout; few fine interstitial and tubular pores; few fine black (10YR 2/1) charcoal stains; common very fine and fine flakes of mica; slightly acid; clear smooth boundary.

C3—23 to 26 inches; light yellowish brown (10YR 6/4) sand; single grain; loose; few fine interstitial and tubular pores; common very fine and fine flakes of mica; moderately acid; abrupt smooth boundary.

C4—26 to 41 inches; yellowish brown (10YR 5/6), dark yellowish brown (10YR 4/4),

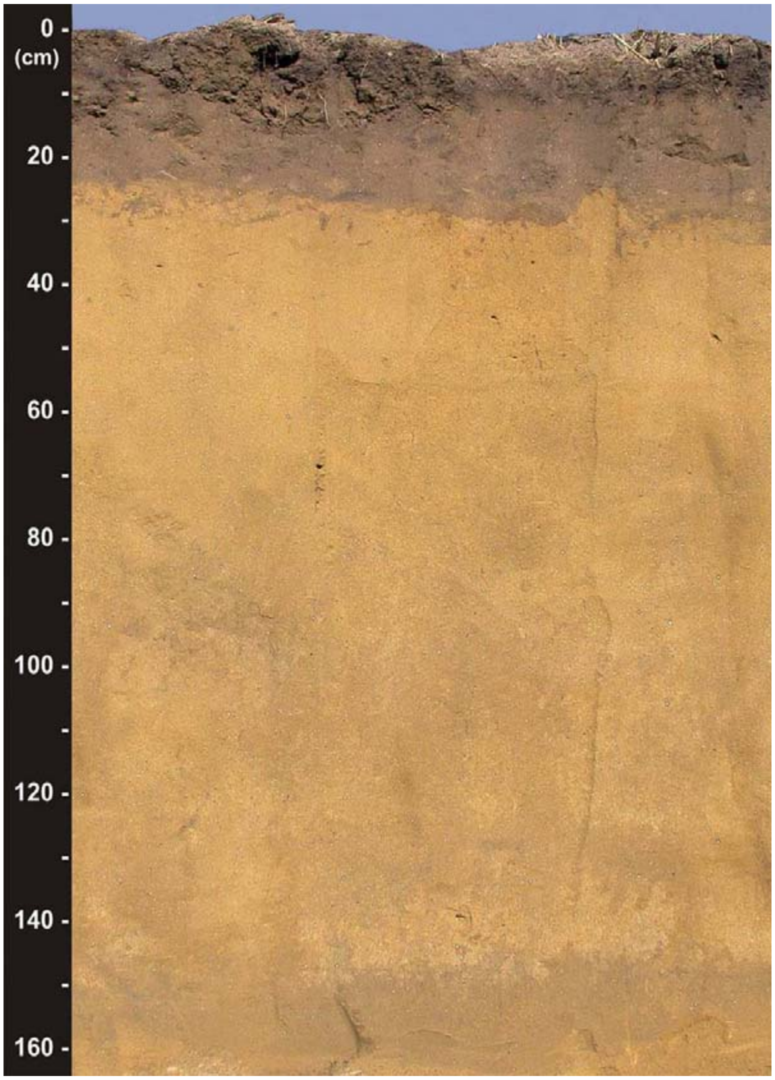

Figure 37.—Typical profile of Biltmore loamy sand. Biltmore soils are very deep and formed from material deposited by streams and consisting mainly of sand. They occur predominantly on large flood plains throughout Buncombe County.

and light yellowish brown (10YR 6/4) sand; few fine faint brown (10YR 5/3) mottles; single grain; loose; few very fine and fine flakes of mica; slightly acid; clear smooth boundary.

C5—41 to 47 inches; dark yellowish brown (10YR 4/6) fine sand; few medium distinct light yellowish brown (10YR 6/4) and few fine prominent strong brown (7.5YR 5/6) mottles; single grain; loose; few fine black (10YR 2/1) charcoal stains; common very fine and fine flakes of mica; slightly acid; clear smooth boundary.

C6—47 to 53 inches; dark yellowish brown (10YR 4/6), light yellowish brown (10YR 6/4), and strong brown (7.5YR 4/6) sand; single grain; loose; common very fine and fine flakes of mica; slightly acid; clear smooth boundary.

C7—53 to 80 inches; brown (10YR 5/3) and dark yellowish brown (10YR 4/4) fine sand; few fine distinct strong brown (7.5YR 4/6) mottles; single grain; loose; common very fine and fine flakes of mica; slightly acid.

Range in Characteristics

Depth to contrasting material: 40 to more than 60 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Depth to bedrock: More than 60 inches
Content of mica flakes: Few to many
Content and size of rock fragments: 0 to 10 percent, by volume, to a depth of 40 inches and variable below a depth of 40 inches; dominantly gravel or cobbles
Soil reaction: Strongly acid to slightly alkaline throughout the profile

A, Ab, and Ap horizons:
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 1 to 6; where value is 3 or less, the A horizon is less than 10 inches thick
Texture—loamy sand, sandy loam, fine sandy loam, loamy fine sand, or sand

Bw horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 6 to 8
Texture—sand, loamy sand, or loamy fine sand

C horizon (to a depth of 40 inches):
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8
Texture—sand, loamy sand, or loamy fine sand alluvium

C horizon (below a depth of 40 inches):
Color—hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 1 to 6
Redoximorphic features (if they occur)—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture—horizon is sand, fine sand, loamy sand, or loamy fine sand alluvium or is stratified with layers of cobbles, gravel, or loamy alluvium

Braddock Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Hillslopes and low mountains, dominantly in the south-central and southeastern parts of the county
Landform: High stream terraces
Landform position: Benches
Slope range: 2 to 30 percent
Taxonomic classification: Fine, mixed, semiactive, mesic Typic Hapludults

Typical Pedon

Braddock clay loam, 8 to 15 percent slopes, moderately eroded (fig. 38); Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25 (Biltmore Avenue), 4.9 miles west on Interstate 240, about 1.7 miles east on Interstate 26 to Exit #2, about 0.4 mile south on North Carolina Highway 191 (Brevard Road), 1.8 miles north on North Carolina Highway 112, about 0.1 mile northeast on a farm road to a borrow area, 50 feet southeast under a power transmission line in a pasture; Enka USGS topographic quadrangle; lat. 35 degrees 32 minutes 27 seconds N. and long. 82 degrees 37 minutes 52 seconds W.; NAD27:

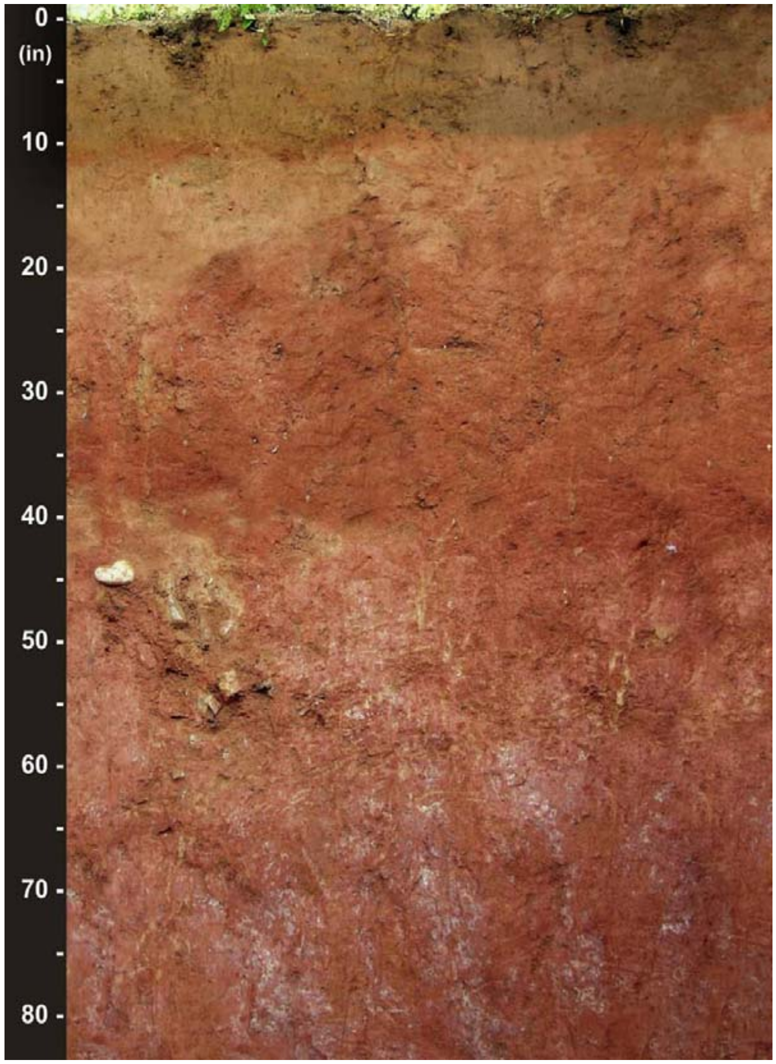

Figure 38.—Typical profile of Braddock clay loam. Braddock soils are very deep and formed from old alluvial deposits on high stream terraces. They occur in mountain valleys of intermountain hills and low mountains predominantly along large flood plains throughout the central and southern parts of Buncombe County.

Ap1—0 to 3 inches; dark brown (7.5YR 3/4) clay loam, brown (7.5YR 5/3) dry; moderate fine granular structure; very friable; many very fine and fine and common medium roots; many medium tubular pores; few very fine flakes of mica; 3 percent, by volume, subangular quartz gravel and cobbles; slightly acid; clear smooth boundary.

Ap2—3 to 9 inches; brown (7.5YR 4/4) clay loam, light brown (7.5YR 6/4) dry; fine medium distinct yellowish red (5YR 4/6) mottles; weak fine granular structure; very friable; many very fine and fine and common medium roots; common fine and many medium tubular pores; few very fine flakes of mica; 3 percent, by volume, subangular quartz gravel and cobbles; slightly acid; clear smooth boundary.

BA—9 to 15 inches; yellowish red (5YR 4/6) clay loam; few fine prominent brown (7.5YR 5/2) mottles on surfaces along root channels and common medium distinct red (2.5YR 4/6) mottles; moderate medium granular structure; friable; slightly sticky, slightly plastic; common very fine and fine roots; common fine and medium

tubular pores; few discontinuous faint yellowish red (5YR 5/6) clay films on faces of peds; few very fine flakes of mica; 4 percent, by volume, subangular quartz gravel and cobbles; moderately acid; gradual wavy boundary.

Bt1—15 to 37 inches; red (10R 5/6) clay; few medium distinct red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; sticky and plastic; common very fine and fine roots; common fine and medium tubular pores; common continuous distinct red (2.5YR 4/6) clay films on faces of peds; few very fine flakes of mica; 4 percent, by volume, rounded quartz gravel and cobbles; strongly acid; gradual wavy boundary.

Bt2—37 to 54 inches; red (2.5YR 4/6) clay; few medium distinct red (10R 5/6), few fine distinct yellowish red (5YR 5/6), and few medium prominent reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; firm; sticky and plastic; few very fine and fine roots; common fine and few coarse tubular pores; few discontinuous faint red (2.5YR 5/6) clay films on faces of peds; few fine flakes of mica; 4 percent, by volume, rounded quartz gravel and cobbles; strongly acid; gradual wavy boundary.

BC—54 to 71 inches; red (2.5YR 4/6) sandy clay loam; few medium distinct red (10R 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; common fine and few medium tubular pores; few patchy faint yellowish red (5YR 4/6) clay films on faces of peds; few common and medium flakes of mica; 12 percent, by volume, rounded quartz gravel and cobbles; strongly acid; gradual wavy boundary.

2C—71 to 83 inches; red (2.5YR 4/8) sandy loam; massive; friable; common fine and medium flakes of mica; strongly acid.

Range in Characteristics

Solum thickness: 40 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few to many
Content and size of rock fragments: Less than 15 percent, by volume, in the A, Ap, and BA horizons and the upper part of the Bt horizon and less than 60 percent in the lower part of the Bt horizon and in the C horizon; dominantly gravel or cobbles
Soil reaction: Extremely acid to strongly acid throughout the profile, except where surface layers have been limed

Ap horizon:
Color—hue of 5YR to 10YR, value of 2 to 5, and chroma of 2 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—clay loam, loam, sandy loam, or fine sandy loam; sandy clay loam, or silty clay loam in eroded pedons

BA horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 8
Texture (fine-earth fraction)—clay loam, sandy clay loam, or clay

Bt horizon:
Color—hue of 10R or 2.5YR, value of 3 to 5, and chroma of 6 to 8; some pedons have subhorizons with hue of 5YR
Texture (fine-earth fraction)—clay, clay loam, or sandy clay

BC horizon:
Color—hue of 10R or 2.5YR, value of 3 to 5, and chroma of 6 or 8; some pedons have subhorizons with hue of 5YR
Texture (fine-earth fraction)—sandy clay loam, clay loam, sandy clay, or clay

2C or C horizon (if it occurs):
Color—hue of 2.5YR to 7.5YR, value of 4 to 8, and chroma of 3 to 6

Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam; some pedons have sandy, gravelly, and cobbly substrata

Brasstown Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock, such as metasandstone or phyllite
Landscape: Ridges and mountain slopes of low and intermediate mountains, dominantly from south of Arden to Ridgecrest in the south-central and southeastern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Fine-loamy, mixed, subactive, mesic Typic Hapludults

Typical Pedon

Brasstown loam in an area of Junaluska-Brasstown complex, 30 to 50 percent slopes; Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25, about 5.1 miles east on Interstate 240, about 12.2 miles east on Interstate 40 to Black Mountain and take Exit #64, about 5.7 miles south on North Carolina Highway 9, about 1.5 miles southwest on Secondary Road 2776 (Chestnut Hill Road), 0.2 mile north on a private drive, about 0.5 mile northeast on a logging road, about 10 feet above a road cut on a forested side slope; Black Mountain USGS topographic quadrangle; lat. 35 degrees 34 minutes 04.2 seconds N. and long. 82 degrees 18 minutes 32.9 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.

A—1 to 5 inches; dark yellowish brown (10YR 3/4) loam, brown (10YR 5/3) dry; weak fine granular structure; very friable; many very fine and fine and common medium and coarse roots; many very fine and fine tubular pores; few very fine and fine flakes of mica; 10 percent, by volume, channers; very strongly acid; clear smooth boundary.

BA—5 to 11 inches; strong brown (7.5YR 4/6) silt loam; weak medium subangular blocky structure; friable; common very fine, fine, and medium roots; common very fine to medium tubular pores; few very fine and fine flakes of mica; 10 percent, by volume, channers; very strongly acid; clear wavy boundary.

Bt—11 to 32 inches; yellowish red (5YR 5/8) clay loam; few fine prominent brownish yellow (10YR 6/6) and common medium prominent dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; friable; common fine and medium and few coarse roots; common fine and medium tubular pores; common faint discontinuous strong brown (7.5YR 5/6) clay films on faces of peds; few fine flakes of mica; 12 percent, by volume, channers; very strongly acid; clear wavy boundary.

BC—32 to 39 inches; yellowish red (5YR 5/8) loam; common medium prominent strong brown (7.5YR 4/6), few medium distinct yellowish red (5YR 4/6), and few fine prominent dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; very friable; few fine roots; few very fine to medium tubular pores; few fine irregular black (5YR 2.5/1) manganese stains throughout; few distinct dark yellowish brown (10YR 4/4) clay films on surfaces of rock fragments; few fine

flakes of mica; 12 percent, by volume, channers; strongly acid; gradual wavy boundary.

C—39 to 52 inches; variegated channery loam saprolite in shades of red, brown, and yellow; massive; very friable; 20 percent, by volume, phyllite channers; few or common fine flakes of mica; strongly acid; gradual irregular boundary.

Cr—52 to 80 inches; weathered, strongly cemented phyllite; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 26 to 59 inches
Depth to bedrock: 40 to 60 inches to weathered bedrock
Content of mica flakes: None or few
Content and size of rock fragments: Less than 35 percent, by volume; dominantly gravel or channers but ranging to stones in the C horizon
Soil reaction: Extremely acid to moderately acid throughout the profile

A or Ap horizon:
Color—hue of 10YR to 5YR, value of 2 to 5, and chroma of 2 to 8; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, fine sandy loam, very fine sandy loam, or silt loam

BA horizon (if it occurs):
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, very fine sandy loam, silt loam, or sandy clay loam

Bt horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8; at least part of the horizon has hue of 2.5YR or 5YR
Texture (fine-earth fraction)—clay loam, loam, sandy clay loam, silty loam, or silty clay loam

BC horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, very fine sandy loam, silt loam, or sandy clay loam

C or CB horizon (if it occurs):
Color—horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8 or is mixed or mottled in shades of these colors
Texture (fine-earth fraction)—fine sandy loam, very fine sandy loam, sandy loam, or loam saprolite
Other characteristics—thin parallel layers of saprolite and Bt horizon material may occur along fracture planes

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Breakneck Series

Depth class: Moderately deep
Drainage class: Well drained

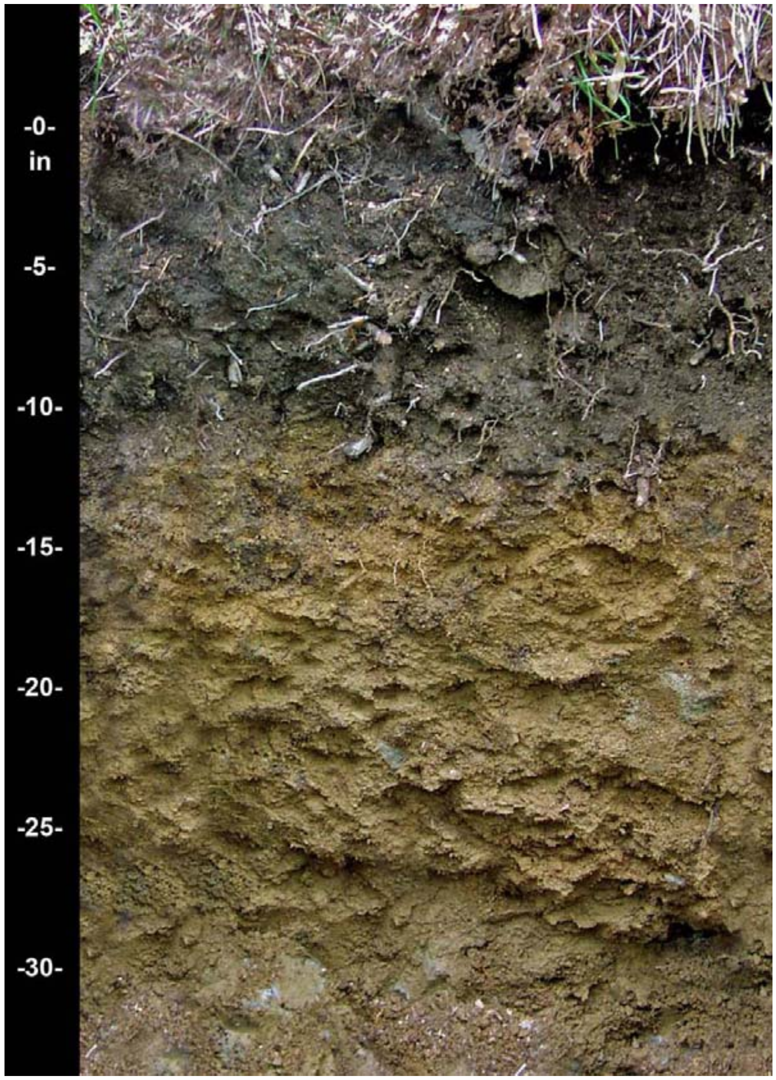

Figure 39.—Typical profile of Breakneck channery loam. Breakneck soils are moderately deep to unweathered hard bedrock and have thick, dark surface layers. They occur in the northwestern part of Buncombe County on high mountains in the Sandymush Bald area.

Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rocks, such as metasandstone and phyllite
Landscape: High mountains at Sandymush Bald in the northwestern part of the county
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Slope range: 50 to 95 percent
Taxonomic classification: Fine-loamy, isotic, frigid Humic Dystrudepts

Typical Pedon

Breakneck channery loam in an area of Breakneck-Pullback complex, 15 to 30 percent slopes, very rocky (fig. 39); Sevier County, Tennessee (Great Smoky Mountains National Park); from Gatlinburg, 15.5 miles southeast on U.S. Highway 441

to Newfound Gap on the Tennessee-North Carolina State line, 7.4 miles southwest on the Clingmans Dome Road to a parking lot at the road's end, about 0.5 mile northwest on a trail to Clingmans Dome, about 40 feet south of the Appalachian Trail and 300 feet west of the summit of Clingmans Dome (between the observation tower and the Appalachian Trail); Clingmans Dome USGS topographic quadrangle; lat. 35 degrees 33 minutes 46 seconds N. and long. 83 degrees 29 minutes 58 seconds W.; NAD27:

Oe—0 to 3 inches; moderately decomposed organic litter and root mat.
A1—3 to 8 inches; black (10YR 2/1) clay loam; moderate fine and medium granular structure; friable; common coarse and very coarse and many fine and medium roots; 10 percent, by volume, metasandstone channers; extremely acid; abrupt wavy boundary.
A2—8 to 12 inches; very dark brown (10YR 2/2) channery loam; moderate coarse granular structure; friable; common fine roots; 25 percent, by volume, metasandstone channers; very strongly acid; abrupt wavy boundary. (Combined thickness of the A horizon is 8 to 18 inches.)
Bw—12 to 28 inches; dark yellowish brown (10YR 4/4) channery loam; weak coarse subangular blocky structure; friable; few fine roots; 25 percent, by volume, metasandstone channers; very strongly acid; abrupt wavy boundary. (12 to 24 inches thick)
R—28 inches; Thunderhead metasandstone with widely spaced fractures that are more than 4 inches apart; very strongly cemented; very high excavation difficulty.

Range in Characteristics

Solum thickness: 20 to 40 inches
Depth to bedrock: 20 to 40 inches to hard bedrock
Content of mica flakes: None or few
Content and size of rock fragments: Less than 35 percent, by volume; dominantly channers and flagstones
Soil reaction: Extremely acid to strongly acid throughout the profile

A horizon:
Color—hue of 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—clay loam or loam
Thickness of surface horizon—8 to 18 inches

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8
Texture (fine-earth fraction)—loam or sandy loam

BC horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8
Texture (fine-earth fraction)—loam or sandy loam

C horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8
Texture (fine-earth fraction)—loam or sandy loam

Cr layer (if it occurs):
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasandstone rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, metasandstone rock
Excavation difficulty—moderate or high

Brownwood Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from high-grade metamorphic rocks having a high mica content, such as mica schist and mica gneiss
Landscape: Low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, paramicaceous, mesic Typic Dystrudepts

Typical Pedon

Brownville fine sandy loam in an area of Micaville-Brownville complex, 50 to 95 percent slopes, stony; Buncombe County, North Carolina; from Asheville, 2.1 miles south on U.S. Highway 25 (Biltmore Avenue) to Biltmore Village, 5.75 miles south on U.S. Highway 25-A (Sweeten Creek Road), about 1.0 mile southeast on Secondary Road 3156 (Mills Gap Road), 1.6 miles east on Secondary Road 3150 (Concord Road), 0.5 mile north on Secondary Road 3119 (Merrill Cove Road), about 1.4 miles northwest on a private road (Merrill Chase Road), about 100 feet southwest of the road on a forested side slope; Fruitland USGS topographic quadrangle; lat. 35 degrees 29 minutes 58.2 seconds N. and long. 82 degrees 29 minutes 09.6 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.
A—1 to 6 inches; dark yellowish brown (10YR 4/4) fine sandy loam, yellowish brown (10YR 5/4) dry; weak fine granular structure; very friable; many fine to coarse roots; many fine and medium and few coarse tubular pores; few fine flakes of mica; 5 percent, by volume, gravel and channers; very strongly acid; clear smooth boundary.
Bw1—6 to 14 inches; yellowish brown (10YR 5/6) loam; moderate coarse subangular blocky structure; friable; common fine to coarse roots; common very fine and fine tubular pores; few medium and many fine flakes of mica; 5 percent, by volume, gravel and channers; very strongly acid; clear wavy boundary.
Bw2—14 to 23 inches; strong brown (7.5YR 5/8) sandy loam; moderate coarse subangular blocky structure; friable; few fine to coarse roots; few very fine or fine tubular and vesicular pores; many fine flakes of mica; 10 percent, by volume, gravel and channers; strongly acid; clear wavy boundary.
BC—23 to 28 inches; yellowish brown (10YR 5/4) gravelly sandy loam; weak coarse subangular blocky structure; very friable; few fine to coarse roots; few very fine tubular and vesicular pores; common medium and many fine flakes of mica; 17 percent, by volume, gravel and channers; strongly acid; abrupt wavy boundary.
Cr—28 to 81 inches; weathered, strongly cemented mica schist; moderate or high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 15 to 39 inches
Depth to bedrock: 20 to 40 inches to weathered bedrock and more than 60 inches to hard bedrock

Content of mica flakes: Common or many in the A horizon and many in the B and C horizons
Content and size of rock fragments: 5 to less than 35 percent, by volume; dominantly gravel and channers but including cobbles or stones
Soil reaction: Very strongly acid or strongly acid throughout the profile, except where surface layers have been limed

A or Ap horizon:
Color—hue of 7.5YR to 10YR, value of 3 to 5, and chroma of 2 to 4; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

BA horizon (if it occurs):
Color—hue of 7.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

BC horizon (if it occurs):
Color—hue of 7.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

C horizon (if it occurs):
Color—horizon has hue of 7.5YR to 10YR, value of 4 to 8, and chroma of 2 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, micaceous, weakly to strongly cemented, high-grade metamorphic rock, such as mica schist or mica gneiss
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Burton Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic to mafic, igneous and high-grade metamorphic rock
Landscape: High mountains on Mt. Pisgah in the southwestern part of the county and Craggy Gardens to Potato Knob in the northeastern part
Landform: Ridges and mountain slopes
Landform position: Summits and upper side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, frigid Humic Dystrudepts

Typical Pedon

Burton sandy clay loam in an area of Burton-Craggey complex, windswept, 15 to 30 percent slopes, rocky; Buncombe County, North Carolina; from Asheville, 5.2 miles on Interstate 240 East to Interstate 40 and U.S. Highway 74 interchange, 0.25 mile southeast on U.S. Highway 74, about 20.8 miles northeast on the Blue Ridge Parkway

to Craggy Gardens overlook, 0.25 mile west of the overlook parking lot along a trail to a shelter, 600 feet south of the shelter, about 50 feet east of the trail in rhododendron and on a grassy bald; Craggy Pinnacle USGS topographic quadrangle; lat. 35 degrees 41 minutes 45.5 seconds N. and long. 82 degrees 23 minutes 00.1 seconds W.; NAD27:

Oe—0 to 2 inches; mat of moderately decomposing leaves and twigs laced with many fine to coarse live roots.

A1—2 to 9 inches; very dark brown (10YR 2/2) sandy clay loam; weak fine granular structure; very friable; many very fine to coarse roots; 8 percent, by volume, gravel and cobbles and 3 percent stones; common very fine and fine flakes of mica; very strongly acid; clear smooth boundary.

A2—9 to 17 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak medium and coarse subangular blocky structure; very friable; common very fine to coarse roots; 10 percent, by volume, gravel and cobbles; common very fine and fine flakes of mica; very strongly acid; clear smooth boundary

Bw—17 to 26 inches; dark yellowish brown (10YR 4/6) sandy loam; weak medium and coarse subangular blocky structure; very friable; few very fine and fine roots; 11 percent gravel and cobbles; common very fine and fine flakes of mica; very strongly acid; clear smooth boundary.

Cr—26 to 29 inches; weathered, strongly cemented, moderately fractured metagraywacke; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; abrupt smooth boundary.

R—29 to 81 inches; unweathered, hard, high-grade metagraywacke and kyanite garnet mica schist bedrock.

Range in Characteristics

Solum thickness: 20 to 40 inches

Depth to bedrock: 20 to 40 inches to hard bedrock

Content of mica flakes: Few or common in the A and B horizons and few to many in the C horizon

Content and size of rock fragments: Less than 35 percent, by volume, in the A and B horizons and less than 50 percent in the C horizon; including gravel, cobbles, and stones

Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:

Color—hue of 5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 3 or neutral in hue and value of 4

Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, sandy clay loam, or clay loam

Thickness—10 to 20 inches

Bw horizon:

Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8

Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

BC horizon (if it occurs):

Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8

Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

C horizon (if it occurs):

Color—horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors

Texture (fine-earth fraction)—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, felsic to mafic, high-grade metamorphic or igneous rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, slightly fractured to highly fractured, felsic or mafic, high-grade metamorphic or igneous rock such as metagraywacke
Excavation difficulty—very high or extremely high

Cataloochee Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate in the surface layer and moderately rapid the subsoil and underlying material
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock, such slate, phyllite, and thinly bedded metasandstone
Landscape: High mountains at Sandymush Bald in the northwestern part of the county
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, frigid Humic Dystrudepts

Typical Pedon

Cataloochee clay loam in an area of Oconaluftee-Guyot-Cataloochee complex, windswept, 8 to 15 percent slopes, bouldery (fig. 40); Haywood County, North Carolina (Great Smoky Mountains National Park); from Waynesville, North Carolina, 1.0 mile north of Main Street on U.S. Highway 276, about 7.5 miles southwest on U.S. Highway 23 & 74, about 0.65 mile northwest on Blue Ridge Parkway entrance road at Balsam Gap on the Haywood-Jackson County line, 14.9 miles south on the Blue Ridge Parkway to Wolf Laurel Gap, 6.2 miles north on Balsam Mountain Road (Blue Ridge Parkway Extension) in the Great Smoky Mountains National Park to the Polls Gap trailhead, 250 feet southeast of a parking area on a forested summit; Bunches Bald USGS topographic quadrangle; lat. 35 degrees 33 minutes 44.1 seconds N. and long. 83 degrees 09 minutes 39.2 seconds W.; NAD27:

Oe—0 to 2 inches; moderately decomposed organic litter and root mat.
A1—2 to 4 inches; black (10YR 2/1) clay loam, dark brown (10YR 3/3) dry; weak moderate fine and medium granular structure; very friable; many fine to very coarse roots throughout; common very fine and fine interstitial pores; few fine flakes of mica; 5 percent, by volume, metasandstone channers; ultra acid; clear smooth boundary.
A2—4 to 9 inches; very dark brown (10YR 2/2) clay loam, brown (10YR 4/3) dry; moderate fine and medium granular structure; very friable; common fine and many medium to very coarse roots throughout; few very fine and fine vesicular pores; few fine flakes of mica; 12 percent, by volume, metasandstone channers; ultra acid; clear wavy boundary.
Bw1—9 to 13 inches; dark yellowish brown (10YR 4/6) loam; weak medium and coarse subangular blocky structure; friable; common very fine and fine and few medium and coarse roots throughout; few very fine and fine vesicular pores; few

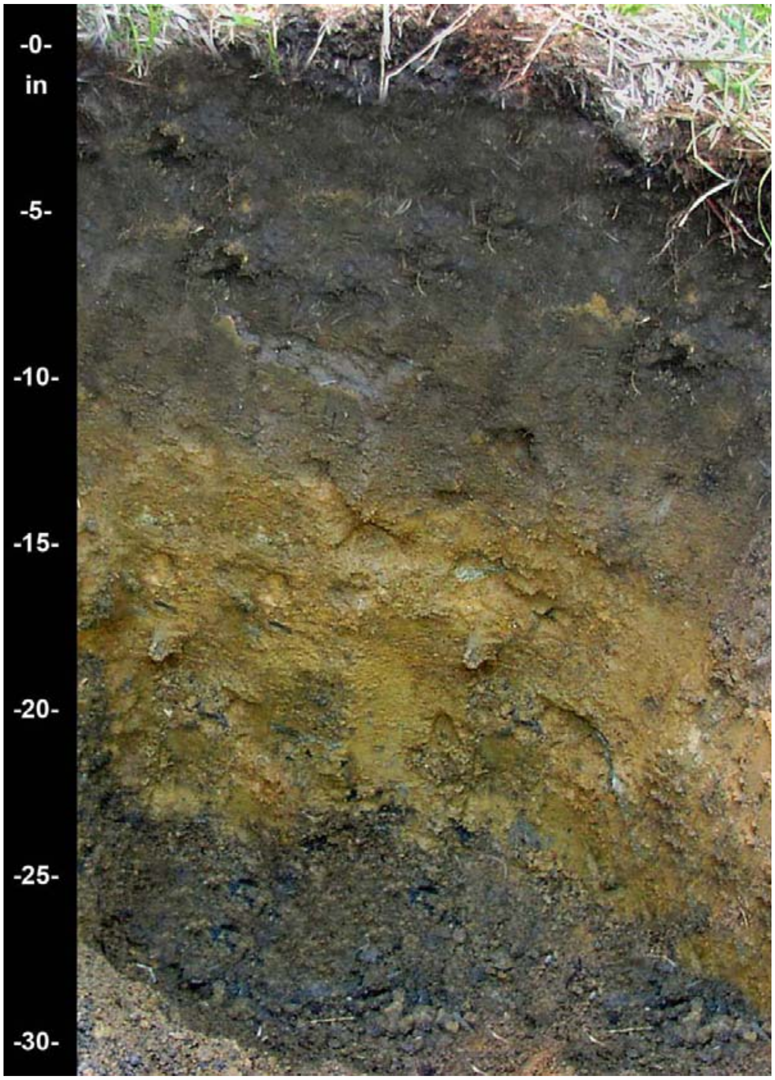

Figure 40.—Typical profile of Cataloochee clay loam. Cataloochee soils are moderately deep to weathered bedrock and have thick, dark surface layers. They occur in the northwestern part of Buncombe County on high mountains in the Sandymush Bald area.

fine flakes of mica; 10 percent, by volume, metasandstone channers; extremely acid; clear smooth boundary.

Bw2—13 to 19 inches; dark yellowish brown (10YR 4/6) channery loam; weak medium and coarse subangular blocky structure; friable; few very fine, fine, and medium roots throughout; 20 percent, by volume, metasandstone channers; few very fine and fine vesicular pores; few fine flakes of mica; very strongly acid; clear smooth boundary.

BC—19 to 25 inches; dark yellowish brown (10YR 4/4) channery sandy loam; weak medium and coarse subangular blocky structure; friable; few very fine and fine roots throughout; few very fine and fine vesicular pores; few fine flakes of mica; 30 percent, by volume, metasandstone channers; very strongly acid; clear wavy boundary.

C—25 to 31 inches; dark yellowish brown (10YR 4/6) channery fine sandy loam;

massive; very friable; few fine flakes of mica; 25 percent, by volume, metasandstone channers; very strongly acid; clear wavy boundary.

Cr—31 to 80 inches; weathered, strongly cemented metasandstone; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 20 to 39 inches
Depth to bedrock: 20 to 40 inches to weathered bedrock
Content of mica flakes: None or few
Content and size of rock fragments: Less than 35 percent, by volume; dominantly channers
Soil reaction: Ultra acid to strongly acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—clay loam, fine sandy loam, or loam
Thickness—10 to 20 inches

AB horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4
Texture (fine-earth fraction)—clay loam, fine sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

BC horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

C horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—fine sandy loam, sandy loam, loamy fine sand, or loamy sand saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Cataska Series

Depth class: Shallow
Drainage class: Excessively drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock, such slate, phyllite, and thinly bedded metasandstone
Landscape: Low and intermediate mountains in the south-central and southeastern parts of the county
Landform: South- to west-facing mountain slopes
Landform position: Side slopes

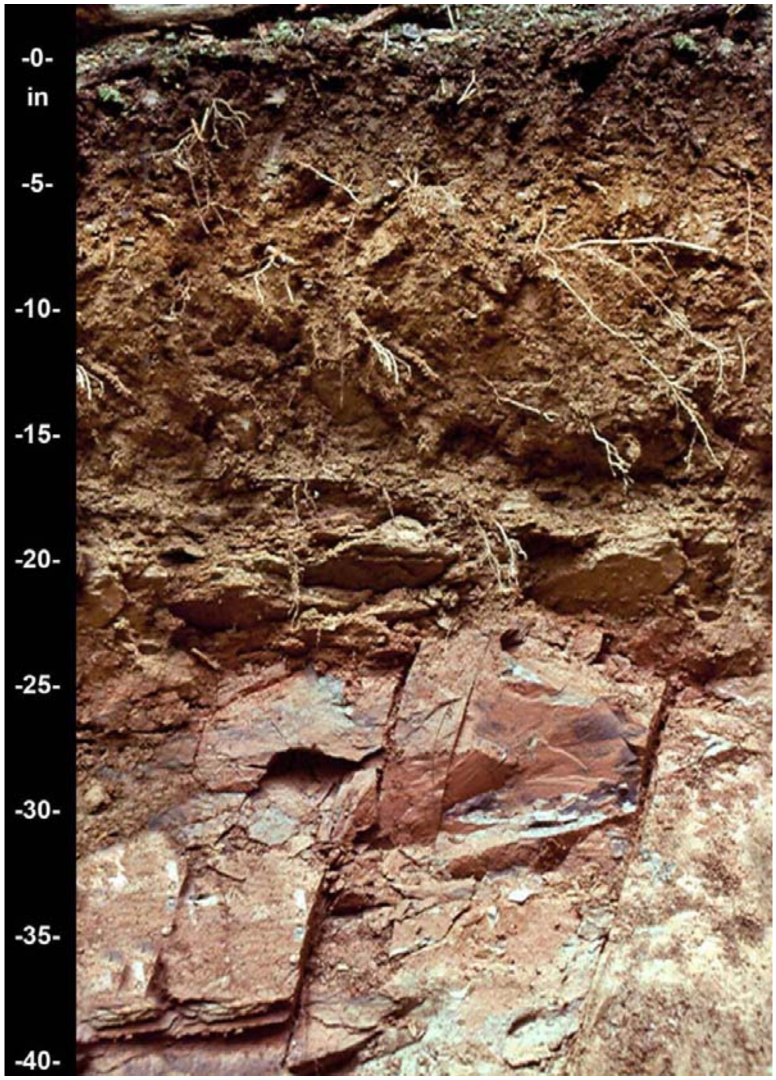

Figure 41.—Typical profile of Cataska channery silt loam. Cataska soils are shallow to weathered bedrock. They occur on low and intermediate mountains predominantly in the south-central and southeastern parts of Buncombe County.

Slope range: 30 to 95 percent
Taxonomic classification: Loamy-skeletal, mixed, semiactive, mesic, shallow Typic Dystrudepts

Typical Pedon

Cataska channery silt loam in an area of Cataska-Sylco complex, 30 to 50 percent slopes, very rocky (fig. 41); Madison County, North Carolina; from Marshall, 10.8 miles north on U.S. Highways 25 & 70, about 5.3 miles west on U.S. Highway 25 & 70 to Hot Springs, 6.2 miles northwest on Secondary Road 1304, about 7.2 miles northeast on U.S. Forest Service Road #468, east of the road on a forested side slope; USGS Hot Springs topographic quadrangle; lat. 35 degrees 56 minutes 02.1 seconds N. and long. 82 degrees 51 minutes 11.7 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.
A—1 to 5 inches; yellowish brown (10YR 5/4) channery silt loam, very pale brown (10YR 7/4) dry; weak fine granular structure; very friable; many very fine and fine and few medium and coarse roots; common very fine and fine discontinuous tubular pores; 25 percent, by volume, channers and 5 percent flagstones; very strongly acid; clear smooth boundary.
Bw—5 to 13 inches; light yellowish brown (10YR 6/4) very channery silt loam; weak fine subangular blocky structure; friable; common very fine, fine, and medium roots; common very fine and fine discontinuous tubular pores; 45 percent, by volume, channers and 10 percent flagstones; very strongly acid; gradual wavy boundary.
Cr—13 to 24 inches; weathered; strongly cemented interbedded slate and phyllite; high excavation difficulty; few fine and medium pores in few thin seams of dark yellowish brown (10YR 4/6) loam in cracks; strongly acid; few medium roots in cracks that are spaced more than 4 inches apart; gradual irregular boundary.
R—24 to 80 inches; unweathered, hard slate bedrock.

Range in Characteristics

Solum thickness: 12 to 20 inches; thickness can be difficult to determine; horizons below the A horizon have many fragments and can be interpreted as a B or C horizon
Depth to bedrock: 10 to 20 inches to weathered bedrock; 20 to 48 inches or more to unweathered bedrock
Content of mica flakes: None
Content and size of rock fragments: 15 to 45 percent, by volume, in the A horizon and 35 to 80 percent in Bw and C horizons; dominantly channers and flagstones
Soil reaction: Extremely acid to strongly acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 to 5, and chroma of 2 to 6; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—silt loam or loam

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8; in some pedons, horizon may have hue of 2.5Y, value of 4 or 5, and chroma of 4 to 6
Texture (fine-earth fraction)—silt loam or loam

C horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8; in some pedons, horizon may have hue of 2.5Y, value of 4 or 5, and chroma of 4 to 6
Texture (fine-earth fraction)—silt loam or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, low-grade metasedimentary rock
Excavation difficulty—very high or extremely high

Cheoah Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock, such interbedded metasandstone or phyllite
Landscape: Intermediate mountains in the northwestern (Sandymush Bald area) and the southeastern parts of the county
Landform: North- to east-facing ridges and mountain slopes and those shaded by the higher mountains
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Fine-loamy, isotic, mesic Humic Dystrudepts

Typical Pedon

Cheoah fine sandy loam in an area of Cheoah-Jeffrey complex, 30 to 50 percent slopes, stony; Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 4.1 miles north on North Carolina Highway 208 to Belva, 8.1 miles northeast on North Carolina Highway 212 to Hickey Fork, 1.2 miles northwest on Secondary Road 1310 to East Prong Hickey Fork, 1.8 miles northeast on U.S. Forest Service Road #465 and right on Little Prong, 2.2 miles northeast on U.S. Forest Service Road #465 to the gate at Whiteoak Flats, 0.3 mile east on U.S. Forest Service Road #290, about 0.5 mile south on U.S. Forest Service Road #288, about 0.3 mile west on a logging road, 750 feet north of the road on a forested side slope; Greystone USGS topographic quadrangle; lat. 36 degrees 01 minute 10 seconds N. and long. 82 degrees 40 minutes 24 seconds W.; NAD27:

Oe—0 to 2 inches; moderately decomposed organic litter and root mat.
A—2 to 11 inches; very dark grayish brown (10YR 3/2) fine sandy loam, brown (10YR 4/3) dry; weak fine granular structure; very friable; many fine, common medium, and few very fine roots; few fine tubular pores; 5 percent, by volume, metasandstone and phyllite channers; very strongly acid; clear wavy boundary.
AB—11 to 14 inches; dark brown (10YR 3/3) loam, dark yellowish brown (10YR 4/4) dry; weak fine subangular structure; very friable; many very fine and fine, common medium, and few coarse roots; few fine tubular pores; 5 percent, by volume, metasandstone and phyllite channers; very strongly acid; clear smooth boundary.
Bw1—14 to 29 inches; strong brown (7.5YR 4/6) loam; weak medium subangular blocky structure; friable; common distinct dark brown (10YR 3/3) organic matter staining on faces of peds; common very fine and fine and few medium roots; few fine tubular pores; few very fine and fine flakes of mica; 10 percent, by volume, metasandstone and phyllite channers; strongly acid; gradual wavy boundary.
Bw2—29 to 40 inches; brown (7.5YR 4/4) loam; weak medium subangular blocky structure; very friable; few very fine, fine, and medium roots; few fine tubular pores; few very fine and fine flakes of mica; 10 percent, by volume, metasandstone and phyllite channers; strongly acid; gradual wavy boundary.
BC—40 to 53 inches; strong brown (7.5YR 5/6) channery loam; weak medium subangular blocky structure; friable; few very fine and fine flakes of mica; 20 percent, by volume, metasandstone and phyllite channers; very strongly acid; gradual wavy boundary.
Cr—53 to 80 inches; weathered, strongly cemented interbedded metasandstone and phyllite; high excavation difficulty; black (7.5YR 2.5/1) iron-manganese streaks along fractures; few seams of strong brown (7.5YR 5/8) channery loam along

fractures; very strongly acid; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 30 to 59 inches
Depth to bedrock: 40 to 60 inches to weathered bedrock
Content of mica flakes: None or few
Content and size of rock fragments: Less than 35 percent, by volume; dominantly channers and flagstones
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—fine sandy loam, loam, or silt loam

AB or BA horizon (if it occurs):
Color—hue of 7.5YR or 10YR and value and chroma of 3 or 4
Texture (fine-earth fraction)—loam, fine sandy loam, or silt loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, or silt loam

BC or CB horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, or silt loam

C horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, or silt loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Chestnut Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock, such as granite and biotite gneiss
Landscape: Low and intermediate mountains, dominantly in the western and eastern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Chestnut sandy loam in an area of Edneyville-Chestnut complex, 15 to 30 percent slopes, stony (fig. 42); Buncombe County, North Carolina; from Asheville, 0.35 mile

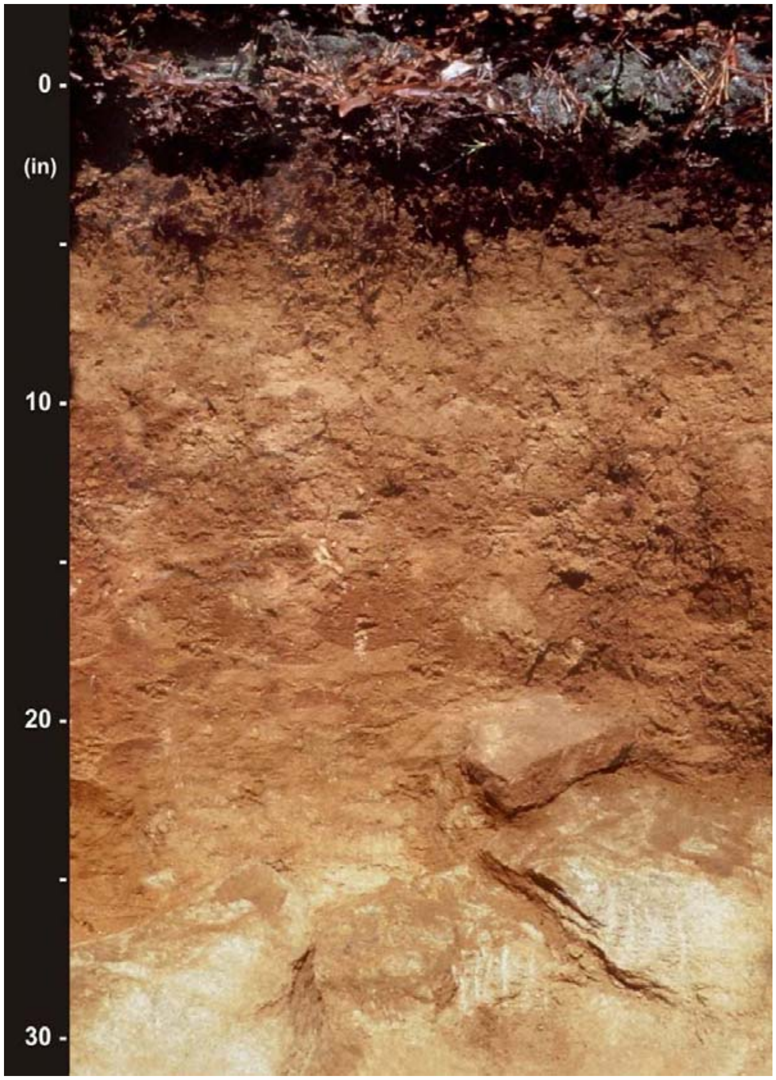

Figure 42.—Typical profile of Chestnut sandy loam. Chestnut soils are moderately deep to weathered bedrock. They occur on low or intermediate mountains predominantly in the eastern and western parts of Buncombe County.

north on U.S. Highway 25 (Biltmore Avenue), 5.1 miles east on Interstate 240, about 12.2 miles east on Interstate 40 to Black Mountain and Exit #64, about 11.9 miles south on North Carolina Highway 9, about 3.2 miles southeast on Secondary Road 2796, about 0.7 mile north on a private road, about 200 feet east on a logging road and about 10 feet above the road on a forested upper side slope; Moffitt Hill USGS topographic quadrangle; lat. 35 degrees 30 minutes 25.6 seconds N. and long. 82 degrees 14 minutes 04.1 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.

A—1 to 5 inches; dark brown (10YR 3/3) sandy loam, dark yellowish brown (10YR 4/6) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; many very fine and fine and common medium and coarse tubular pores; few very fine flakes of mica; 3 percent, by volume, gravel; strongly acid; clear wavy boundary.

BA—5 to 11 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular

blocky structure; very friable; common very fine, fine, and medium and few coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 5 percent, by volume, gravel; strongly acid; gradual wavy boundary.

Bw1—11 to 19 inches; yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure; friable; common fine and medium and few coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 10 percent, by volume, gravel and cobbles; very strongly acid; gradual wavy boundary.

Bw2—19 to 23 inches; yellowish brown (10YR 5/8) sandy loam; weak medium subangular blocky structure; friable; few medium and coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 5 percent, by volume, gravel; very strongly acid; clear wavy boundary.

BC—23 to 31 inches; yellowish brown (10YR 5/4) gravelly sandy loam; weak medium subangular blocky structure; very friable; few coarse roots; few very fine to medium tubular pores; few very fine flakes of mica; 15 percent, by volume, gravel and cobbles; very strongly acid; gradual wavy boundary.

Cr—31 to 80 inches; weathered, strongly cemented granite gneiss; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 15 to 39 inches

Depth to bedrock: 20 to 40 inches to weathered bedrock

Content of mica flakes: Few or common in the A and B horizons and few to many in the C horizon

Content and size of rock fragments: 5 to less than 35 percent, by volume; dominantly gravel or cobbles

Soil reaction: Extremely acid to moderately acid throughout the profile

A or Ap horizon:

Color—hue of 7.5YR to 2.5Y, value of 2 to 6, and chroma of 1 to 6; where value is 3 or less, the A horizon is less than 7 inches thick

Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

BA horizon:

Color—hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 3 or 4

Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

Bw horizon:

Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 8

Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

BC horizon:

Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 8

Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

C horizon (if it occurs):

Color—horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors

Texture (fine-earth fraction)—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam saprolite

Cr layer:

Type of bedrock—weathered, weakly to strongly cemented, felsic or mafic high-grade metamorphic or igneous rock

Excavation difficulty—moderate or high

Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Chiltoskie Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Colluvium derived from materials weathered from low-grade metasedimentary rock, such as slate, phyllite, and thinly bedded metasandstone
Landscape: High mountains at Sandymush Bald in the northwestern part of the county
Landform: Coves and drainageways
Landform position: Head slopes, footslopes, and toeslopes
Slope range: 30 to 50 percent
Taxonomic classification: Fine-loamy, isotic, frigid Typic Dystrudepts

Typical Pedon

Chiltoskie loam in an area of Chiltoskie-Heintooga-Horsetrough complex, 8 to 15 percent slopes, very stony; Swain County, North Carolina; from Bryson City, 9.9 miles east on U.S. Highway 19 to Cherokee, 2.8 miles north on U.S. Highway 441 to the Great Smoky Mountains National Parkway, 11.1 miles northeast on the Blue Ridge Parkway to Wolf Laurel Gap, 9.1 miles north on Balsam Mountain Road (Blue Ridge Parkway Extension) to Balsam Picnic area, 400 feet south-southeast of the parking area on a forested toeslope; Bunches Bald USGS topographic quadrangle; lat. 35 degrees 34 minutes 17 seconds N. and long. 83 degrees 10 minutes 48 seconds W.; NAD27:

Oe—0 to 2 inches; moderately decomposed organic litter and root mat.
A—2 to 8 inches; very dark brown (10YR 2/2) loam, dark brown (10YR 3/3) dry; moderate medium to very coarse granular structure; very friable; many fine to coarse and common very coarse roots throughout; common very fine to medium tubular pores; few fine flakes of mica; 5 percent, by volume, metasandstone channers; extremely acid; clear wavy boundary.
Bw1—8 to 14 inches; dark yellowish brown (10YR 4/4) loam; moderate fine to coarse subangular blocky structure; friable; few medium roots throughout; common very fine to medium tubular pores; few fine flakes of mica; 10 percent, by volume, metasandstone channers; very strongly acid; clear smooth boundary.
Bw2—14 to 43 inches; dark yellowish brown (10YR 4/6) loam; moderate fine to coarse subangular blocky structure; friable; few very fine tubular pores; few fine flakes of mica; 5 percent, by volume, metasandstone channers; very strongly acid; clear smooth boundary.
Bw3—43 to 80 inches; dark yellowish brown (10YR 4/6) very channery sandy loam; weak medium and coarse subangular blocky structure; friable; few very fine tubular pores; few fine flakes of mica; 40 percent, by volume, metasandstone channers; very strongly acid.

Range in Characteristics

Solum thickness: 40 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common
Content and size of rock fragments: Less than 35 percent, by volume, above a depth of 40 inches and less than 60 percent below a depth of 40 inches; dominantly channers and flagstones
Soil reaction: Extremely acid to strongly acid throughout the profile

A horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3; where value is 3 or less, the horizon is less than 7 inches thick

Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or clay loam

Bw horizon:

Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8; colors with value and chroma of 3 are derived from parent material and not organic matter content

Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

Cleveland Series

Depth class: Shallow
Drainage class: Somewhat excessively drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Somewhat excessively drained
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock, such as granite and biotite gneiss
Landscape: Low and intermediate mountains in the eastern and western parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Loamy, mixed, active, mesic Lithic Dystrudepts

Typical Pedon

Cleveland sandy loam in an area of Ashe-Cleveland-Rock outcrop complex, 15 to 30 percent slopes, very stony (fig. 43); Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25 (Biltmore Avenue), 5.1 miles east on Interstate 240, about 12.2 miles east on Interstate 40 to Black Mountain and Exit #64, about 11.9 miles south on North Carolina Highway 9, about 3.2 miles southeast on Secondary Road 2796, about 0.8 mile north on a private road to an unnamed gap, 0.6 mile north on a logging road, about 50 feet north past the road's end near the Rutherford County line, on a forested summit; Moffitt Hill USGS topographic quadrangle; lat. 35 degrees 30 minutes 55.2 seconds N. and long. 82 degrees 14 minutes 03.1 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.

A1—1 to 3 inches; very dark grayish brown (10YR 3/2) sandy loam, dark yellowish brown (10YR 4/4) dry; weak medium granular structure; very friable; many very fine and fine and few medium roots; common very fine and fine tubular pores; few very fine flakes of mica; 7 percent, by volume, gravel and 3 percent cobbles; very strongly acid; clear smooth boundary.

A2—3 to 5 inches; dark yellowish brown (10YR 4/3) sandy loam, dark yellowish brown (10YR 4/6) dry; weak medium granular structure; very friable; many very fine and fine and few medium roots; few very fine and fine tubular pores; few very fine flakes of mica; 7 percent, by volume, gravel and 3 percent cobbles; very strongly acid; clear smooth boundary.

Bw—5 to 17 inches; dark yellowish brown (10YR 4/6) sandy loam; weak medium subangular blocky structure; very friable; few very fine to medium roots; few very fine to medium tubular pores; common very fine flakes of mica; 10 percent, by volume, gravel and 6 percent cobbles; strongly acid; abrupt wavy boundary.

R—17 to 81 inches; unweathered, moderately fractured granitic gneiss bedrock.

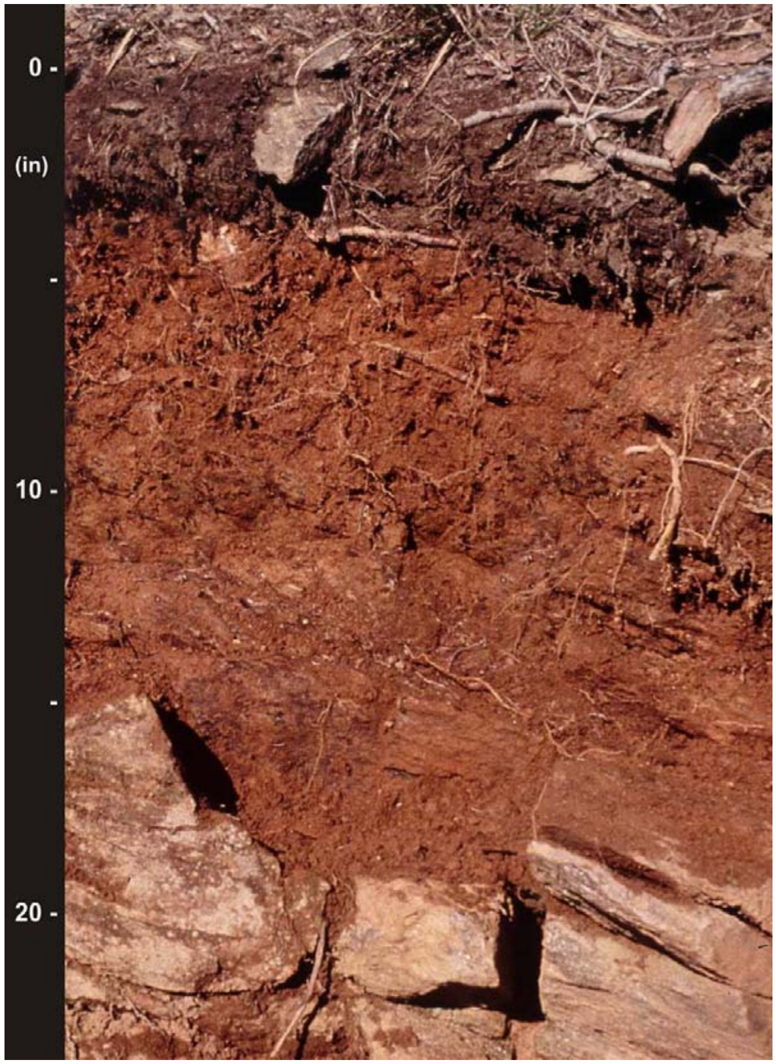

Figure 43.—Typical profile of Cleveland sandy loam. Cleveland soils are shallow to unweathered hard bedrock. They occur on low or intermediate mountains predominantly in the eastern and western parts of Buncombe County.

Range in Characteristics

Solum thickness: 10 to 20 inches
Depth to bedrock: 10 to 20 inches to hard bedrock
Content of mica flakes: Few or common
Content and size of rock fragments: Less than 35 percent, by volume; dominantly gravel or cobbles
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 to 5, and chroma of 1 to 4; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

C horizon (if it occurs):
Color—horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 or 4 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam saprolite

R layer:
Type of bedrock—unweathered, hard, felsic or mafic high-grade metamorphic or igneous rock
Excavation difficulty—very high or extremely high

Clifton Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate in the surface layer and subsoil and moderately rapid in the underlying material
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock high in ferro-magnesium minerals, such as amphibolite and biotite hornblende gneiss
Landscape: Intermountain hills and low or intermediate mountains dominantly in the Asheville Basin, in the central and southern portions of the county
Landform: Ridges, hillslopes, and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 2 to 50 percent
Taxonomic classification: Fine, mixed, semiactive, mesic Typic Hapludults

Typical Pedon

Clifton clay loam, 8 to 15 percent slopes, moderately eroded (fig. 44); Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25 (Biltmore Avenue), about 1.0 mile west on Interstate 240, about 10.1 miles north on Interstate 26 to Exit #17 (Flat Creek Road), 0.6 mile north on Secondary Road 2207, about 0.6 mile west on Secondary Road 1733, about 185 feet north of the road, near a power line, on an upper side slope in a cultivated field; Weaverville USGS topographic quadrangle; lat. 35 degrees 44 minutes 15.3 seconds N. and long. 82 degrees 33 minutes 46.2 seconds W.; NAD27:

Ap—0 to 8 inches; strong brown (7.5YR 4/4) clay loam, dark yellowish brown (10YR 4/6) dry; few moderate prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; few fine flakes of mica; slightly acid; abrupt smooth boundary.
Bt1—8 to 20 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm; sticky, plastic; common very fine, fine, and medium roots; common very fine and fine tubular pores; few discontinuous faint reddish brown (2.5YR 4/4) clay films on faces of peds; few fine flakes of mica; slightly acid; clear wavy boundary.
Bt2—20 to 29 inches; red (2.5YR 5/6) clay; few fine distinct strong brown (7.5YR 5/6) mottles throughout; moderate medium subangular blocky structure; firm; sticky, plastic; common very fine and few medium roots; common very fine and medium tubular pores; common discontinuous faint red (2.5YR 4/4) clay films on faces of peds; few fine rounded soft masses of black (5YR 2.5/1) iron-manganese concretions; few very fine flakes of mica; slightly acid; gradual wavy boundary.
Bt3—29 to 42 inches; red (2.5YR 4/6) clay; many medium distinct yellowish red (5YR

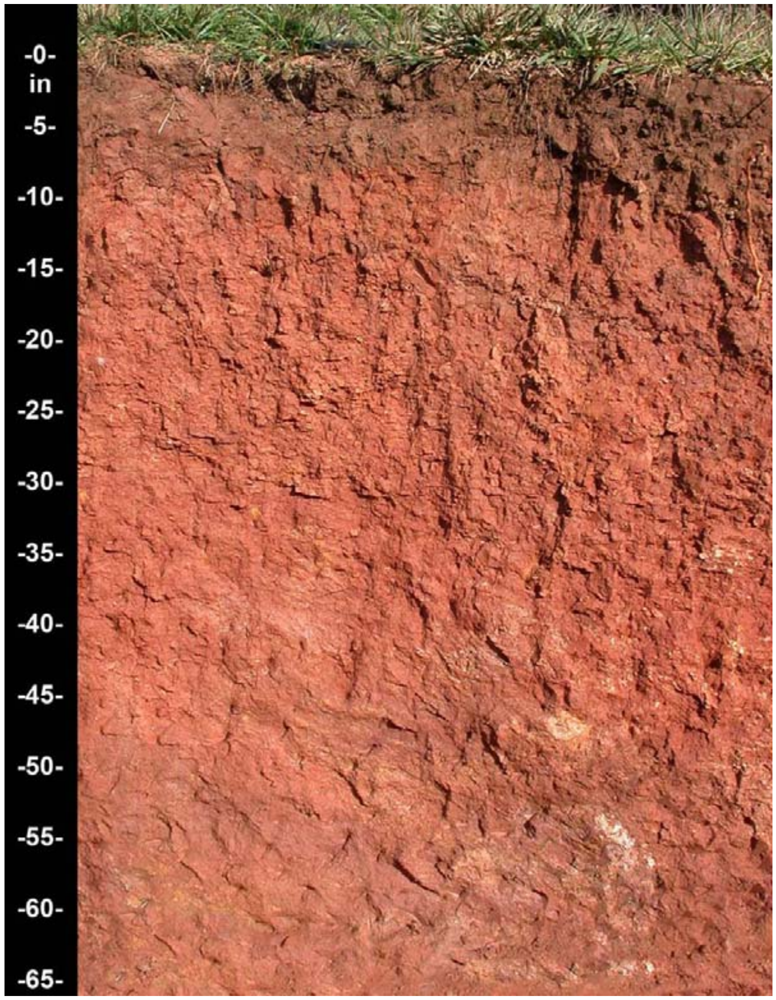

Figure 44.—Typical profile of Clifton clay loam. Clifton soils are very deep over saprolite. They occur on intermountain hills and low or intermediate mountains, predominantly in the central and southern parts of Buncombe County.

5/8), strong brown (7.5YR 5/8), and brownish yellow (10YR 6/6) mottles throughout; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; common very fine and few fine roots; common very fine and few medium tubular pores; common fine and medium continuous faint yellowish red (5YR 4/6) clay films on faces of peds; common fine and medium rounded soft masses of black (5YR 2.5/1) iron-manganese concretions; few very fine flakes of mica; strongly acid; gradual wavy boundary.

BC1—42 to 65 inches; yellowish red (5YR 5/6) clay loam; many medium distinct strong brown (7.5YR 5/8) and brownish yellow (10YR 6/6) mottles throughout; weak coarse subangular blocky structure; few very fine and fine roots; common very fine and few fine tubular pores; common discontinuous faint yellowish red (5YR 4/6) clay films on faces of peds; many fine and common medium rounded soft masses of black (5YR 2.5/1) iron-manganese concretions throughout; common very fine flakes of mica; strongly acid; gradual irregular boundary.

BC2—65 to 83 inches; red (2.5YR 4/6) loam; common medium prominent reddish yellow (7.5YR 6/8) mottles throughout; weak fine subangular blocky structure;

friable, nonsticky, nonplastic; few very fine roots; few very fine and few fine tubular pores; many fine and common medium rounded soft masses of black (5YR 2.5/1) iron-manganese concretions throughout; common very fine flakes of mica; strongly acid; gradual irregular boundary.

C—83 to 101 inches; variegated loam saprolite in shades of red, brown, yellow, and white; massive; friable; few very fine roots; few very fine tubular pores; many fine rounded soft masses of black (5YR 2.5/1) iron-manganese concretions throughout; common fine flakes of mica; strongly acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common
Content and size of rock fragments: Less than 15 percent, by volume, throughout the profile
Soil reaction: Very strongly acid to slightly acid throughout the profile, except where surface layers have been limed

Ap horizon:
Color—hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—clay loam or sandy clay loam; loam or fine sandy loam in uneroded pedons

BA horizon (if it occurs):
Color—hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—loam, clay loam, or sandy clay loam

Bt horizon:
Color—hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8
Texture (fine-earth fraction)—clay, clay loam, or sandy clay

BC horizon:
Color—hue of 10R to 5YR, value of 4 to 6, and chroma of 6 to 8
Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

C horizon:
Color—horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 6 to 8 and may be mixed or mottled in shades of these colors
Mottles—shades of red, brown, yellow, gray, or white
Texture (fine-earth fraction)—loam or fine sandy loam saprolite

Clingman Series

Depth class: Very shallow or shallow
Drainage class: Somewhat excessively drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid in the organic layers and moderate or moderately rapid in the mineral horizon
Parent material: Organic deposits underlain by mineral layers, weathered from felsic, high-grade metamorphic rock
Landscape: High mountains of the Pisgah and Craggy Mountain Ranges
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 30 to 95 percent
Taxonomic classification: Dysic, frigid Lithic Udifolists

Figure 45.—Typical profile of Clingman peat. Clingman soils are shallow or very shallow and have thin organic deposits over unweathered hard bedrock. They occur on the high mountains of the Pisgah and Craggy Mountain Ranges in Buncombe County.

Typical Pedon

Clingman peat in an area of Craggey-Rock outcrop-Clingman complex, windswept, 30 to 50 percent slopes, rubbly (fig. 45); Yancey County, North Carolina; from Burnsville, 4.0 miles east on U.S. Highway 19E to the Micaville exit, 14.2 miles south on North Carolina Highway 80S, 11.4 miles south on the Blue Ridge Parkway, 2.2 miles north on North Carolina Highway 128, about 1.5 miles northeast on an unmarked gravel road, 50 feet above the road, on a forested side slope; Mt. Mitchell USGS topographic quadrangle; lat. 35 degrees 42 minutes 32 seconds N. and long. 82 degrees 15 minutes 02 seconds W.; NAD27:

Oi—0 to 7 inches; black (N 2/0) broken face peat, very dark brown (7.5YR 2/2) crushed and rubbed (fibric material); about 80 percent fiber, 50 percent rubbed; massive; loose; many very fine to medium roots; 5 percent twigs; extremely acid; clear smooth boundary.

Oe—7 to 15 inches; very dark brown (10YR 2/2) broken face mucky peat, dark grayish brown (10YR 3/2) crushed and rubbed (hemic material); about 60 percent fiber, 20 percent rubbed; massive; friable; many fine to medium roots; extremely acid; clear smooth boundary.

AE—15 to 19 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; common fine roots; 5 percent, by volume, gravel; extremely acid; abrupt smooth boundary.

R—19 to 30 inches; unweathered, slightly fractured metagraywacke.

Range in Characteristics

Solum thickness: 3 to 20 inches

Depth to bedrock: 3 to 20 inches to hard bedrock
Content of mica flakes: None to many
Content and size of rock fragments: Less than 15 percent, by volume, in the mineral layer; mostly gravel or cobbles
Soil reaction: Organic material—ultra acid or extremely acid; mineral layer—extremely acid to strongly acid

Oi horizon:
Color—hue of 2.5YR to 10YR, value of 2 or 3, and chroma of 1 to 3 or neutral in hue and value of 2 or 3
Texture—slightly decomposed leaves, needles, twigs, and moss (fibric material)

Oe horizon:
Color—hue of 2.5YR to 10YR, value of 2 or 3, and chroma of 1 to 3 or neutral in hue and value of 2 or 3
Texture—partially decomposed organic material (hemic material)

Oa horizon (if it occurs):
Color—hue of 2.5YR to 10YR, value of 2 to 4, and chroma of 1 to 3 or neutral in hue and value of 2 to 4
Texture—highly decomposed organic material (sapric material)

A or AE horizon:
Color—horizon is variegated; has hue of 5YR to 5B, value of 2 to 7, and chroma of 1 to 6; or is mixed or mottled in shades of these colors
Texture—loamy sand, loamy fine sand, sandy loam, fine sandy loam, very fine sandy loam, or loam

E, EB, Bw, Bs, Bhs, and C horizons (if they occur):
Color—horizon is variegated; has hue of 5YR to 5B, value of 2 to 7, and chroma of 1 to 6; or is mixed or mottled in shades of these colors
Texture—loamy sand, loamy fine sand, sandy loam, fine sandy loam, very fine sandy loam, or loam

R layer:
Type of bedrock—unweathered, slightly fractured to highly fractured, felsic, high-grade metamorphic rock

Cowee Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock, such as hornblende gneiss, biotite gneiss, or amphibolite
Landscape: Intermountain hills and low or intermediate mountains, dominantly in the north-central, southeastern, and southwestern parts of the county
Landform: Ridges and south- to west-facing hillslopes and mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Fine-loamy, parasesquic, mesic Typic Hapludults

Typical Pedon

Cowee sandy loam in an area of Evard-Cowee complex, 15 to 30 percent slopes, stony (fig. 46); from Asheville, 0.35 mile north on U.S. Highway 25 North, 4.9 miles

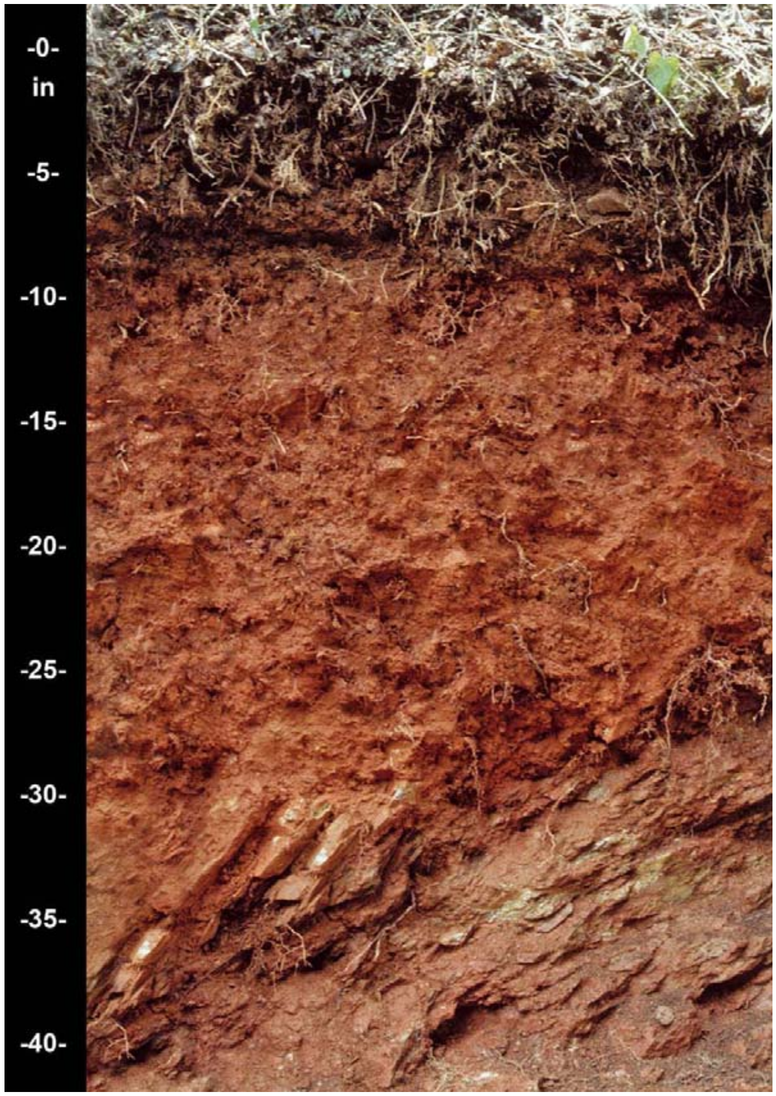

Figure 46.—Typical profile of Cowee sandy loam. Cowee soils are moderately deep to unweathered bedrock. They occur on intermountain hills and low or intermediate mountains predominantly in the south-central, southeastern, and southwestern parts of Buncombe County.

west on Interstate 240, about 1.6 miles east on Interstate 26, about 2.5 miles south on North Carolina Highway 191 (Brevard Road), 0.25 mile south on entrance to Blue Ridge Parkway, 1.4 miles south on Blue Ridge Parkway, about 150 feet northeast on a forested summit; Skyland USGS topographic quadrangle; lat. 35 degrees 29 minutes 1.75 seconds N. and long. 82 degrees 36 minutes 7.9 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.

A—1 to 4 inches; dark yellowish brown (10YR 4/4) sandy loam, brown (7.5YR 4/4) dry; weak fine granular structure; very friable; common very fine and fine and few medium and coarse roots; few very fine to medium tubular pores; few very fine flakes of mica; 5 percent, by volume, gravel and 5 percent cobbles; very strongly acid; clear smooth boundary.

BA—4 to 7 inches; strong brown (7.5YR 5/6) sandy loam; weak medium granular

structure; friable; common very fine and fine and few medium and coarse roots; few very fine to medium tubular pores; few very fine flakes of mica; 5 percent, by volume, gravel and 5 percent cobbles; very strongly acid; clear smooth boundary.

Bt1—7 to 14 inches; yellowish red (5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; common very fine and fine and few medium and coarse roots; few very fine, fine, and medium tubular pores; few faint red (2.5YR 4/6) clay films on surfaces of peds; few fine flakes of mica; 5 percent, by volume, gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.

Bt2—14 to 25 inches; yellowish red (5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; few very fine to coarse roots; few very fine to medium tubular pores; common faint yellowish red (5YR 4/6) clay films on surfaces of peds; common fine and medium black (N 2.5/0) iron-manganese concretions throughout; few or common fine and medium flakes of mica; 10 percent, by volume, gravel and 2 percent cobbles; very strongly acid; gradual wavy boundary.

BC—25 to 29 inches; reddish brown (5YR 5/4) gravelly sandy loam; moderate medium subangular blocky structure; friable; few very fine to coarse roots; few very fine to medium tubular pores; common faint yellowish red (5YR 4/6) clay films on surfaces of peds; few or common fine and medium flakes of mica; 15 percent, by volume, gravel and 5 percent cobbles; very strongly acid; gradual irregular boundary.

Cr—29 to 80 inches; weathered, strongly cemented gneiss; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 15 to 39 inches

Depth to bedrock: 20 to 40 inches to weathered bedrock

Content of mica flakes: Few or common

Content and size of rock fragments: Less than 35 percent, by volume; ranging from gravel to stones

Soil reaction: Extremely acid to moderately acid throughout the profile, except where surface layers have been limed

A or Ap horizon:

Color—hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 8; where value is 3 or less, the A horizon is less than 7 inches thick

Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam; clay loam or sandy clay loam in eroded pedons

BA horizon:

Color—hue of 5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8

Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

Bt horizon:

Color—hue of 2.5YR to 5YR, value of 4 to 6, and chroma of 4 to 8

Texture (fine-earth fraction)—clay loam, sandy clay loam, or loam

BC horizon (if it occurs):

Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8

Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, or sandy clay loam

C horizon (if it occurs):

Color—horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8 and may be mixed or mottled in shades of these colors

Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, felsic or mafic high-grade metamorphic or igneous rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Craggey Series

Depth class: Shallow
Drainage class: Somewhat excessively drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic to mafic, igneous and high-grade metamorphic rock
Landscape: High mountains on Mt. Pisgah in the southwestern part of the county and Craggy Gardens to Potato Knob in the northeastern part
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 30 to 95 percent
Taxonomic classification: Loamy, isotic, frigid Humic Lithic Dystrudepts

Typical Pedon

Craggey loam in an area of Burton-Craggey complex, windswept, 15 to 30 percent slopes, rocky (fig. 47); Buncombe County, North Carolina; from Asheville, 5.2 miles on Interstate 240 East to Interstate 40 and U.S. Highway 74 interchange, 0.25 mile southeast on U.S. Highway 74, about 20.8 miles northeast on the Blue Ridge Parkway to the Craggy Gardens overlook, 0.25 mile west of the overlook parking lot along a trail to a shelter, 600 feet south of the shelter, about 50 feet west of a trail in rhododendron and on a grassy bald; Craggy Pinnacle USGS topographic quadrangle; lat. 35 degrees 41 minutes 45.6 seconds N. and long. 82 degrees 23 minutes 01.6 seconds W.; NAD27:

Oe—0 to 1 inch; mat of decomposing leaves and twigs laced with many fine live roots.
A1—1 to 8 inches; very dark brown (10YR 2/2) loam; weak fine granular structure; very friable; many very fine and few medium roots; 3 percent, by volume, gravel; common very fine and fine flakes of mica; very strongly acid; clear smooth boundary.
A2—8 to 14 inches; very dark grayish brown (10YR 3/2) sandy loam; weak medium granular structure; very friable; few very fine and fine roots; 5 percent, by volume, gravel; strongly acid; clear wavy boundary.
R—14 inches; hard, high-grade metagraywacke and kyanite, garnet, mica schist bedrock.

Range in Characteristics

Solum thickness: 10 to 20 inches
Depth to bedrock: 10 to 20 inches to hard bedrock
Content of mica flakes: Few or common
Content and size of rock fragments: 5 to less than 35 percent, by volume; mostly gravel, cobbles, or stones
Soil reaction: Extremely acid to moderately acid throughout the profile
Other characteristics: The O horizon makes up less than two-thirds of the total thickness of the soil and is underlain by mineral layers 5 or more inches thick

Figure 47.—Typical profile of Craggey loam. Craggey soils are shallow to unweathered hard bedrock and have thick, dark surface layers. They occur on high mountains predominantly in the northeastern and southwestern parts of Buncombe County.

O horizon (if it occurs):
Color—hue of 2.5YR to 10YR, value of 2 or 3, and chroma of 1 to 3 or neutral in hue and value of 2 or 3
Texture—peat (Oi), mucky peat (Oe), or muck (Oa)

A horizon:
Color—hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, silt loam, or sandy clay loam
Thickness—10 to 19 inches

AB horizon (if it occurs):
Color—hue of 5YR to 10YR, value of 3, and chroma of 3 or 4
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, silt loam, or sandy clay loam

Bw horizon (if it occurs):
Color—hue of 7.5YR or 10YR and value and chroma of 3 to 6
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

Cr layer (if it occurs):
Type of bedrock—weathered, weakly to strongly cemented, felsic to mafic, high-grade metamorphic or igneous rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, slightly fractured to highly fractured, felsic or mafic, high-grade metamorphic or igneous rock, such as metagraywacke,
Excavation difficulty—very high or extremely high

Dellwood Series

Depth class: Very deep
Drainage class: Moderately well drained
Depth to seasonal high water table: 2.0 to 4.0 feet from December through May and 2.5 to 4.5 feet from June through November
Permeability: Moderately rapid in the A horizon and rapid or very rapid in the C horizon
Parent material: Recent alluvium that is sandy in the upper part and sandy-skeletal in the lower part, derived from materials weathered from felsic or mafic, high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of low and intermediate mountains throughout the county
Landform: Flood plains dominantly at the upper end of mountain valleys
Landform position: Planar to slightly convex bottomland slopes
Slope range: 0 to 3 percent
Taxonomic classification: Sandy-skeletal, mixed, mesic Oxyaquic Dystrudepts

Typical Pedon

Dellwood gravelly fine sandy loam in an area of Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded (fig. 48); Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25 (Biltmore Avenue), about 1.0 mile west on Interstate 240, about 12.6 miles north on Interstate 26 to Exit #15 (Barnardsville exit), 6.1 miles east-northeast on North Carolina Highway 197 to Barnardsville, 3.6 miles southeast on Secondary Road 2173 along the creek to the Dillingham Community, 1.3 miles east-northeast of Secondary Road 2173 to U.S. Forest Service boundary, about 180 feet northwest on the U.S. Forest Service road along Corner Rock Creek (past first bridge crossing Walker Branch), about 10 feet southeast of the road on a forested flood plain; Barnardsville USGS topographic quadrangle; lat. 35 degrees 45 minutes 17.9 seconds N. and long. 82 degrees 23 minutes 07.4 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.
A1—1 to 12 inches; very dark brown (10YR 2/2) gravelly fine sandy loam, dark brown (10YR 3/2) dry; weak fine granular structure; very friable; many very fine, fine, and medium and common coarse roots; many very fine and fine tubular pores; common very fine and fine flakes of mica; 12 percent, by volume, gravel and 8 percent cobbles; strongly acid; clear smooth boundary.
A2—12 to 16 inches; dark yellowish brown (10YR 3/4) gravelly sandy loam, dark brown (10YR 4/4) dry; weak fine granular structure; very friable; many very fine, fine, and medium and common coarse roots; many very fine and fine tubular pores; common very fine and fine flakes of mica; 15 percent, by volume, gravel, 10 percent cobbles, and 5 percent stones; strongly acid; gradual wavy boundary.
C1—16 to 32 inches; dark yellowish brown (10YR 4/4) very cobbly coarse sand; single grain; loose; few very fine, medium, and coarse roots; few very fine, fine, and medium flakes of mica; 10 percent, by volume, gravel, 20 percent cobbles, and 15 percent stones; moderately acid; clear smooth boundary.
C2—32 to 64 inches; dark yellowish brown (10YR 3/4) extremely cobbly coarse sand; single grain; loose; few very fine, medium, and coarse roots; few fine distinct dark grayish brown (10YR 4/2) and light brownish gray (10YR 6/2) irregularly shaped iron depletions with clear boundaries throughout; common very fine and fine and

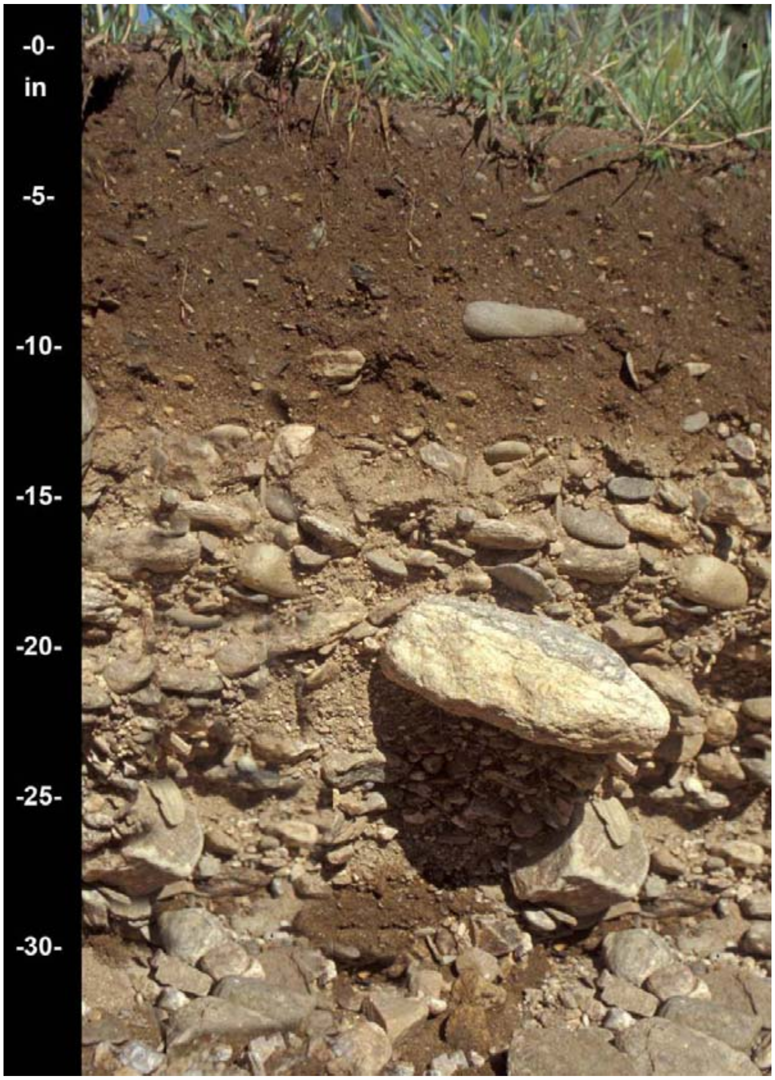

Figure 48.—Typical profile of Dellwood gravelly fine sandy loam. Dellwood soils formed formed from material deposited by streams and consist mainly of sand, gravel, and cobbles. They occur predominantly at the upper end of flood plains throughout Buncombe County.

few coarse flakes of mica; 20 percent, by volume, gravel, 30 percent cobbles, 10 percent stones, and 5 percent boulders; moderately acid; clear smooth boundary.

C3—64 to 81 inches; variegated extremely cobbly coarse sand in shades of brown, yellow, and gray; single grain; loose; few very fine and medium roots; few fine distinct dark grayish brown (10YR 4/2) and light brownish gray (10YR 6/2) irregularly shaped iron depletions with clear boundaries throughout; common fine and medium flakes of mica; 15 percent, by volume, gravel, 35 percent cobbles, 15 percent stones, and 5 percent boulders; strongly acid.

Range in Characteristics

Solum thickness: 8 to 20 inches

Depth to contrasting material: 8 to 20 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material

Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common in the A and B horizons and few to many in the C horizon
Content and size of rock fragments: Less than 35 percent, by volume, in the A and B horizons and more than 35 percent in the C horizon; dominantly gravel or cobbles but including stones
Soil reaction: Very strongly acid to neutral throughout the profile

A or Ap horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loamy fine sand
Thickness of the A horizon—10 to 20 inches

AC horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3, and chroma of 2 to 4
Texture—coarse sand, sand, loamy coarse sand, or loamy sand

Bw horizon (if it occurs):
Color—hue of 7.5YR or 10YR and value and chroma of 4 to 6
Texture (fine-earth fraction)—sandy loam or fine sandy loam

C horizon:
Color—hue of 7.5YR, value of 3 to 5, and chroma of 4 to 6; hue of 10YR, value of 3 to 6, and chroma of 3 to 8; or hue of 2.5Y and value and chroma of 4 to 6
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—coarse sand, sand, loamy coarse sand, or loamy sand alluvium

Dillard Series

Depth class: Very deep
Drainage class: Moderately well drained
Depth to seasonal high water table: 2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Permeability: Moderately slow
Parent material: Loamy alluvium and colluvium derived from materials weathered from felsic or mafic, high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of low mountains, dominantly in the central and southern parts of the county
Landform: Low stream terraces
Landform position: Concave to planar toeslopes
Slope range: 1 to 5 percent
Taxonomic classification: Fine-loamy, mixed, semiactive, mesic Aquic Hapludults

Typical Pedon

Dillard loam, 1 to 5 percent slopes, rarely flooded; Buncombe County, North Carolina; from Asheville, 5.2 miles on Interstate 240 to Interstate 40 and U.S. Highway 74 interchange, 6.9 miles southeast on U.S. Highway 74, about 3.8 miles southwest on Secondary Road 3136, about 0.25 mile south on a private road and 400 feet south of the road in a cultivated field; Fruitland USGS topographic quadrangle; lat. 35 degrees 28 minutes 34.2 seconds N. and long. 82 degrees 26 minutes 27.5 seconds W.; NAD27:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loam, light yellowish brown (10YR

6/4) dry; weak medium subangular blocky structure; friable; few very fine mica flakes; strongly acid; abrupt smooth boundary.

Bt1—8 to 25 inches; dark yellowish brown (10YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; few very fine mica flakes; very strongly acid; gradual wavy boundary.

Bt2—25 to 31 inches; light yellowish brown (10YR 6/4) clay loam; moderate medium subangular blocky structure; friable; many medium prominent strong brown (7.5YR 5/8) and brownish yellow (10YR 6/8) irregularly shaped masses of iron accumulation with clear boundaries in the matrix; few faint clay films on faces of peds; few very fine mica flakes; very strongly acid; gradual wavy boundary.

Btg—31 to 43 inches; light brownish gray (10YR 6/2) clay loam; moderate medium subangular blocky structure; friable; many medium faint grayish brown (10YR 5/2) irregularly shaped iron depletions with clear boundaries throughout; common distinct clay films on faces of peds; common very fine mica flakes; very strongly acid; gradual smooth boundary.

BCg—43 to 51 inches; light brownish gray (10YR 6/2) loam; massive; friable; many medium faint light gray (10YR 7/1) irregularly shaped iron depletions with clear boundaries throughout; few very fine mica flakes; strongly acid; gradual wavy boundary.

Cg—51 to 80 inches; grayish brown (10YR 5/2) sandy loam; massive; friable; common medium prominent dark gray (N 4/0) irregularly shaped iron depletions with clear boundaries throughout; few very fine mica flakes; 8 percent, by volume, waterworn gravel and 2 percent cobbles; very strongly acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common
Content and size of rock fragments: Less than 5 percent, by volume, in the A, Ap, or BA horizon; less than 15 percent in the Bt horizon; less than 5 percent in the Btg, 2Btg, BCg, or 2BCg horizon; less than 35 percent in the C, 2C, Cg, or 2Cg horizon
Soil reaction: Strongly acid to moderately acid in the A horizon, except where surface layers have been limed, and very strongly acid to moderately acid in the B and C horizons

Ap horizon:
Color—hue of 10YR, value of 3 to 5, and chroma of 1 to 4; where value is 3 or less, the A horizon is less than 10 inches thick
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

Bt horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray; iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—sandy clay loam or clay loam

Btg and BCg horizons:
Color—hue of 10YR, value of 5 to 7, and chroma of 1 or 2
Redoximorphic features—iron or clay depletions in shades of gray; iron accumulations in shades of brown or yellow
Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

C horizon (if it occurs):
Color—hue of 10YR to 5Y, value of 5 to 7, and chroma of 3 to 8

Redoximorphic features—iron or clay depletions in shades of gray; iron accumulations in shades of red, brown, or yellow
Texture (fine-earth fraction)—loam, sandy clay loam, or clay loam alluvium/ colluvium

Cg horizon:
Color—hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2
Redoximorphic features—iron or clay depletions in shades of red, yellow, brown, olive, or gray
Texture (fine-earth fraction)—loam, sandy clay loam, or clay loam alluvium/ colluvium

Edneyville Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock, such as granite and biotite gneiss
Landscape: Low and intermediate mountains, dominantly in the western and eastern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Edneyville sandy loam in an area of Edneyville-Chestnut complex, 30 to 50 percent slopes, stony (fig. 49); Buncombe County, North Carolina; from Asheville, 5.1 miles east on Interstate 240, about 12.2 miles east on Interstate 40 to Black Mountain and take Exit #64, about 11.9 miles south on North Carolina Highway 9, about 3.5 miles southeast on Secondary Road 2796, about 250 feet south-southeast of the road on a 40 percent side slope in a forested area; Moffitt Hill USGS topographic quadrangle; lat. 35 degrees 30 minutes 10.2 seconds N. and long. 82 degrees 13 minutes 38.6 seconds W.; NAD27:

Oe—0 to 2 inches; moderately decomposed organic litter and root mat.
A—2 to 5 inches; dark grayish brown (10YR 3/4) sandy loam, yellowish brown (10YR 5/4) dry; weak medium granular structure; very friable; many very fine and fine, common medium, and few coarse roots; many very fine to medium and common coarse tubular pores; 5 percent, by volume, gravel; very strongly acid; clear smooth boundary.
Bw1—5 to 23 inches; dark yellowish brown (10YR 4/6) sandy loam; weak medium subangular blocky structure; friable; common very fine to medium and few coarse roots; common fine to medium and few coarse tubular pores; few fine flakes of mica; 5 percent, by volume, gravel; strongly acid; clear wavy boundary.
Bw2—23 to 46 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few very fine to medium roots; few very fine to medium tubular pores; few very fine flakes of mica; 5 percent, by volume, gravel; strongly acid; gradual wavy boundary.
BC—46 to 53 inches; yellowish brown (10YR 5/4) sandy loam; weak fine subangular blocky structure; very friable; few very fine to coarse roots; common very fine to

Figure 49.—Typical profile of Edneyville sandy loam. Edneyville soils are very deep to soft bedrock. They occur on low or intermediate mountains predominantly in the eastern and western parts of Buncombe County.

medium tubular pores; few very fine flakes of mica; 3 percent, by volume, gravel; very strongly acid; gradual wavy boundary.

C—53 to 68 inches; light yellowish brown (10YR 6/4) sandy loam saprolite; massive; very friable; few medium roots; few very fine to coarse tubular pores; few thin discontinuous lenses of loamy sand; few very fine flakes of mica; 10 percent, by volume, gravel; very strongly acid; abrupt smooth boundary.

Cr—68 to 80 inches; weathered, strongly cemented gneiss; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 20 to 55 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common

Content and size of rock fragments: Less than 35 percent, by volume; dominantly gravel
Soil reaction: Extremely acid to moderately acid in the A horizon, and very strongly acid or strongly acid in the B and C horizons

A or Ap horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 to 5, and chroma of 1 to 4; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

AB horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR or 2.5Y, value of 4 to 7, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

BC horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8 or is mixed or mottled in shades of these colors; colors with chroma of 2 or less are inherited from the parent material and are not caused by wetness
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

C horizon:
Color—horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8 or is mixed or mottled in shades of these colors; colors with chroma of 2 or less are inherited from the parent material and are not caused by wetness
Texture (fine-earth fraction)—sandy loam, fine sandy loamy, loam, loamy fine sand, or loamy sand saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, felsic or mafic high-grade metamorphic or igneous rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Evard Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock, such as hornblende gneiss, biotite gneiss, or amphibolite
Landscape: Intermountain hills and low or intermediate mountains, dominantly in the north-central, southeastern, and southwestern parts of the county
Landform: Ridges and south- to west-facing hillslopes and mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Fine-loamy, parasesquic, mesic Typic Hapludults

Typical Pedon

Evard loam in an area of Evard-Cowee complex, 15 to 30 percent slopes, stony; from Asheville, 0.35 mile north on U.S. Highway 25 North, 4.9 miles west on Interstate 240,

about 1.6 miles east on Interstate 26, about 2.5 miles south on North Carolina Highway 191 (Brevard Road), 0.25 mile south on entrance to Blue Ridge Parkway, 1.3 miles south on Blue Ridge Parkway, about 100 feet northeast on a forested upper side slope; Skyland USGS topographic quadrangle; lat. 35 degrees 29 minutes 4.5 seconds N. and long. 82 degrees 36 minutes 4.7 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.
A—1 to 4 inches; dark yellowish brown (10YR 4/4) loam, light yellowish brown (10YR 6/4) dry; weak fine granular structure; very friable; many very fine, common fine and medium, and few coarse roots; common very fine to medium tubular pores; few very fine flakes of mica; 5 percent, by volume, gravel; strongly acid; clear smooth boundary.
BA—4 to 7 inches; strong brown (7.5YR 4/6) loam; moderate medium granular structure; friable; common very fine, fine, and medium and few coarse roots; common very fine to medium tubular pores; few very fine flakes of mica; 5 percent, by volume, gravel; strongly acid; clear smooth boundary.
Bt1—7 to 15 inches; yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; common very fine and few fine to coarse roots; few fine and medium tubular pores; few faint distinct red (2.5YR 4/8) clay films on faces of peds; few very fine flakes of mica; 5 percent, by volume, gravel; strongly acid; gradual wavy boundary.
Bt2—15 to 37 inches; yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; friable; few very fine to medium roots; few very fine to medium tubular pores; few faint distinct red (2.5YR 4/6) clay films on faces of peds; common fine and medium black (N 2.5/0) iron-manganese concretions; few very fine flakes of mica; 5 percent, by volume, gravel; very strongly acid; gradual wavy boundary.
BC—37 to 53 inches; red (2.5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable; few very fine to coarse roots; few very fine and fine tubular pores; few faint red (2.5YR 4/8) clay films in cracks; many fine, medium, and coarse black (N 2.5/0) iron-manganese concretions; few fine flakes of mica; 10 percent, by volume, gravel; very strongly acid; gradual wavy boundary.
C1—53 to 74 inches; red (2.5YR 4/6) fine sandy loam saprolite; common moderate distinct reddish yellow (7.5YR 6/8) and common moderate distinct yellowish brown (10YR 5/4) mottles; massive; very friable; few very fine and medium roots; few very fine and fine tubular pores; many fine, medium, and coarse black (N 2.5/0) iron-manganese concretions; common fine flakes of mica; 5 percent, by volume, gravel; strongly acid; gradual wavy boundary.
C2—74 to 89 inches; variegated sandy loam saprolite in shades of red, brown, yellow, gray, and white; massive; very friable; few very fine and medium roots; few very fine and fine tubular pores; many fine, medium, and coarse black (N 2.5/0) iron-manganese concretions; common fine flakes of mica; 5 percent, by volume, gravel; strongly acid.

Range in Characteristics

Solum thickness: 20 to more than 40 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: None to common
Content and size of rock fragments: Less than 35 percent, by volume, in the A and C horizons and less than 15 percent in the B horizon; ranging from gravel to stones
Soil reaction: Very strongly acid to moderately acid throughout the profile, except where surface layers have been limed

A or Ap horizon:
Color—hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam; sandy clay loam or clay loam in eroded pedons

BA horizon:
Color—hue of 2.5YR to 10YR and value and chroma of 4 to 8
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, sandy clay loam, or clay loam

Bt horizon:
Color—hue of 2.5YR to 5YR, value of 4 or 5, and chroma of 4 to 8
Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

BC horizon:
Color—horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 6 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, sandy clay loam, or clay loam

C horizon:
Color—horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 6 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loam, sandy loam, loamy sand, loamy fine sand, fine sandy loam, or very fine sandy loam saprolite

Fannin Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Residuum affected by soil creep in the upper part, weathered from high-grade metamorphic rock with a high mica content, such as mica schist or mica gneiss
Landscape: Intermountain hills and low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 30 percent
Taxonomic classification: Fine-loamy, paramicaceous, mesic Typic Hapludults

Typical Pedon

Fannin clay loam in an area of Fannin-Lauada complex, 8 to 15 percent slopes, moderately eroded (fig. 50); Buncombe County, North Carolina; from Asheville, 2.1 miles south on U.S. Highway 25 (Biltmore Avenue) to Biltmore Village, 5.75 miles south on U.S. Highway 25-A (Sweeten Creek Road), 3.1 miles southeast on Secondary Road 3116 (Mills Gap Road), about 0.25 mile northwest on a private gated farm road in a hayfield; Fruitland USGS topographic quadrangle; lat. 35 degrees 28 minutes 12.5 seconds N. and long. 82 degrees 29 minutes 08.1 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.
Ap—1 to 8 inches; brown (7.5YR 4/4) clay loam, strong brown (7.5YR 5/6) dry; weak fine granular structure; very friable; common very fine and fine roots; common

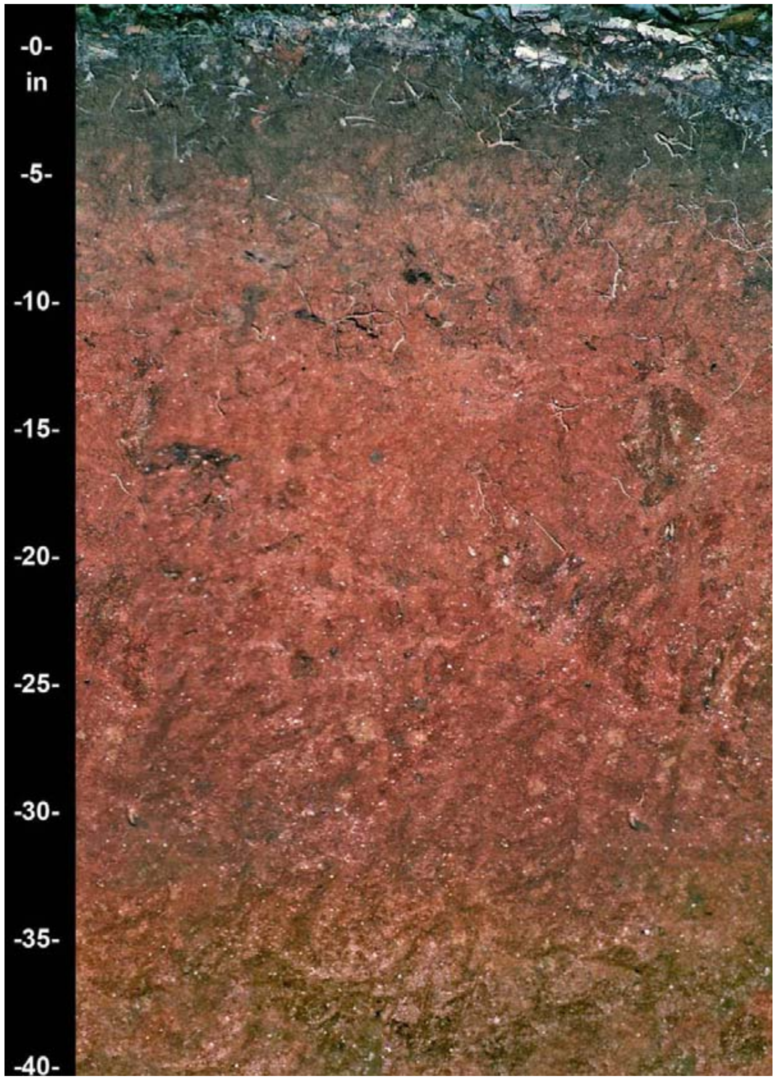

Figure 50.—Typical profile of Fannin clay loam. Fannin soils have a high content of mica in the subsoil and are very deep to soft bedrock. They occur on low and intermediate mountains predominantly in the south-central part of Buncombe County.

very fine and fine vesicular pores; common very fine and fine flakes of mica; 5 percent, by volume, gravel; very strongly acid; clear smooth boundary.

Bt1—8 to 17 inches; yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; common very fine and fine and few coarse tubular pores; common distinct reddish yellow (5YR 6/6) clay films on faces of peds; many very fine flakes of mica; 5 percent, by volume, gravel; very strongly acid; gradual wavy boundary.

Bt2—17 to 31 inches; yellowish red (5YR 5/6) clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; many very fine mica flakes; 5 percent, by volume, gravel; strongly acid; clear smooth boundary.

BC—31 to 46 inches; yellowish red (5YR 5/8) loam; weak medium subangular blocky structure; very friable; few coarse and common fine and medium roots; few very fine tubular pores; very few faint yellowish red (5YR 4/6) clay films in root channels

and pores; many fine flakes of mica; 5 percent, by volume, gravel; strongly acid; clear smooth boundary.

C—46 to 81 inches; variegated fine sandy loam saprolite in shades of red, yellow, and brown; massive; few medium and coarse roots; few very fine tubular pores; 5 percent, by volume, gravel; strongly acid.

Range in Characteristics

Solum thickness: 20 to 45 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Common or many in the A horizon and upper part of the B horizon and many in the lower part of the B horizon and in the C horizon
Content and size of rock fragments: Less than 35 percent, by volume, in the A and C horizons and 0 to 25 percent in the B horizon; dominantly gravel or cobbles
Soil reaction: Very strongly acid to slightly acid throughout the profile

Ap horizon:
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam; sandy clay loam or clay loam in eroded pedons

BA or BE horizon (if it occurs):
Color—hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6
Texture (fine-earth fraction)—loam, fine sandy loam, or silt loam

Bt horizon:
Color—hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8
Mottles—shades of red, brown, or yellow
Texture (fine-earth fraction)—loam, sandy clay loam, or clay loam

BC horizon:
Color—hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8
Mottles—shades of red, brown, or yellow
Texture (fine-earth fraction)—sandy clay loam, loam, fine sandy loam, or sandy loam

C horizon:
Color—horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8 and may be mixed or mottled in shades of these colors
Mottles—shades of red, brown, or yellow
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam saprolite

French Series

Depth class: Very deep
Drainage class: Moderately well drained to somewhat poorly drained
Depth to seasonal high water table: 1.0 to 2.5 feet from December through May and 2.0 to 3.5 feet from June through November
Permeability: Moderate in the surface layer and subsoil and rapid in the underlying material
Parent material: Recent alluvium that is loamy in the upper part and sandy or sandy-skeletal in the lower part, derived from materials weathered from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountains valleys of intermountain hills; low and intermediate mountains throughout the county
Landform: Flood plains throughout the county

Landform position: Planar to slightly concave bottomland slopes
Slope range: 0 to 3 percent
Taxonomic classification: Fine-loamy over sandy or sandy-skeletal, mixed, active, mesic Fluvaquentic Dystrudepts

Typical Pedon

French loam, 0 to 3 percent slopes, occasionally flooded; Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25 (Biltmore Avenue), about 1.6 miles west on Interstate 240 to Exit #3, about 1.1 miles west on U.S. Highway 19, 23, 74A (Patton Avenue), 4.5 miles northwest on North Carolina Highway 63 (Leicester Road), 5.3 miles southwest on Secondary Road 1004 (Newfound Road) to Newfound Community Center, 0.1 mile west on Secondary Road 1220 (Morgan Branch Road), about 170 feet north of the road and 75 feet east of Newfound Creek, in a grassed field; Enka USGS topographic quadrangle; lat. 35 degrees 36 minutes 19.6 seconds N. and long. 82 degrees 43 minutes 58.3 seconds W.; NAD27:

Ap—0 to 10 inches; brown (10YR 4/3) loam, yellowish brown (10YR 5/4) dry; weak medium granular structure; very friable; common very fine and fine and few medium roots; common fine and few medium tubular pores; few fine flakes of mica; 3 percent, by volume, gravel; slightly acid; clear smooth boundary.

Bw1—10 to 18 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; common very fine and fine roots; few very fine to medium tubular pores; few fine faint dark grayish brown (10YR 4/2) and few medium prominent dark reddish brown (2.5YR 3 /4) irregularly shaped iron depletions and accumulations, respectively, with clear boundaries throughout; common fine flakes of mica; 3 percent, by volume, gravel; moderately acid; clear smooth boundary.

Bw2—18 to 29 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; common very fine and fine roots; few very fine to medium tubular pores; few fine faint grayish brown (10YR 5/2) and few medium prominent dark reddish brown (5YR 3 /4) irregularly shaped iron depletions and accumulations, respectively, with clear boundaries throughout; common fine flakes of mica; 7 percent, by volume, gravel; moderately acid; clear smooth boundary.

C—29 to 33 inches; brown (10YR 5/3) gravelly sandy loam; massive; very friable; few very fine and fine roots; few medium tubular pores; areas with dark reddish brown (2.5YR 3/4) and strong brown (7.5YR 4/6) irregularly shaped masses of iron accumulations and areas with grayish brown (10YR 5/2) iron depletions with clear boundaries in the matrix; massive; few sand strata 1 to 3 inches thick; common fine flakes of mica; 15 percent, by volume, gravel and 5 percent cobbles; moderately acid; clear wavy boundary.

Cg1—33 to 47 inches; grayish brown (10YR 5/2) very gravelly loamy sand; few medium faint dark gray (10YR 4/1) mottles; massive; very friable; few very fine and fine roots; few medium tubular pores; few fine distinct strong brown (7.5YR 4/6) irregularly shaped masses of iron accumulation with clear boundaries in the matrix; common fine flakes of mica; 30 percent, by volume, gravel and 10 percent cobbles; slightly acid; gradual wavy boundary.

Cg2—47 to 63 inches; dark gray (10YR 4/1) very gravelly sand; single grain; loose; few very fine and fine roots; few medium tubular pores; few fine distinct strong brown (7.5YR 4/6) irregularly shaped masses of iron accumulation and few medium faint grayish brown (10YR 5/2) mottles of iron depletion with clear boundaries in the matrix; common fine flakes of mica; 30 percent, by volume, gravel and 15 percent cobbles; slightly acid; gradual wavy boundary.

Cg3—63 to 81 inches; light brownish gray (10YR 6/2) extremely gravelly sand; single grained; loose; few very fine and fine roots; few medium tubular pores; common

fine flakes of mica; 50 percent, by volume, gravel and 15 percent cobbles; moderately acid.

Range in Characteristics

Solum thickness: 20 to 40 inches
Depth to contrasting material: 20 to 40 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common
Content and size of rock fragments: Less than 15 percent, by volume, in the upper part to depth of 20 to 40 inches and more than 35 percent in the lower part; dominantly gravel or cobbles but may include stones
Soil reaction: Strongly acid to slightly acid throughout the profile

Ap or A horizon:
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 1 to 4; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

BA horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 4 to 8
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or sandy clay loam

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, sandy clay loam, or clay loam

C horizon:
Color—horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 2 to 8 and may be mixed or mottled in shades of these colors
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loamy sand, sandy loam, or loam alluvium

Cg horizon:
Color—hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—sand, loamy sand, coarse sand, or loamy coarse sand alluvium; some pedons have thin horizons of loam, silt loam, or sandy clay loam

Guyot Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate in the surface layer and moderately rapid in the subsoil and underlying material
Parent material: Residuum affected by soil creep in the upper part, weathered from

low-grade metasedimentary rock, such slate, phyllite, and thinly bedded metasandstone
Landscape: High mountains at Sandymush Bald in the northwestern part of the county
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, frigid Humic Dystrudepts

Typical Pedon

Guyot clay loam in an area of Oconaluftee-Guyot-Cataloochee complex, windswept, 8 to 15 percent slopes, bouldery; Haywood County, North Carolina (Great Smoky Mountains National Park); from Waynesville, 1.0 mile north of Main Street on U.S. Highway 276, about 7.5 miles southwest on U.S. Highway 23 & 74, about 0.65 mile northwest on Blue Ridge Parkway entrance road at Balsam Gap on the Haywood-Jackson County line, 14.9 miles south on the Blue Ridge Parkway to Wolf Laurel Gap, 6.2 miles north on Balsam Mountain Road (Blue Ridge Parkway Extension) in the Great Smoky Mountains National Park to the Polls Gap trailhead, 150 feet southeast of a parking area on a forested summit; Bunches Bald USGS topographic quadrangle; lat. 35 degrees 33 minutes 44 seconds N. and long. 83 degrees 09 minutes 39 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.
A1—1 to 7 inches; very dark brown (10YR 2/2) clay loam, brown (10YR 4/3) dry; strong fine and medium granular structure; very friable; many very fine and fine and common medium to very coarse roots throughout; common very fine and fine interstitial pores; few fine flakes of mica; 5 percent, by volume, metasandstone channers; extremely acid; clear wavy boundary.
A2—7 to 11 inches; dark brown (10YR 3/3) clay loam, dark yellowish brown (10YR 4/4) dry; moderate fine granular structure; friable; common very fine and fine and few medium and coarse roots throughout; few very fine and fine vesicular pores; few fine flakes of mica; 5 percent, by volume, metasandstone channers; extremely acid; clear smooth boundary.
Bw—11 to 19 inches; dark yellowish brown (10YR 4/6) loam; moderate medium subangular blocky structure; friable; few medium and coarse roots throughout; few very fine and fine vesicular pores; few fine flakes of mica; 10 percent, by volume, metasandstone channers; very strongly acid; clear smooth boundary.
BC—19 to 28 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; friable; few fine flakes of mica; 10 percent, by volume, metasandstone channers; very strongly acid; clear wavy boundary.
C1—28 to 35 inches; yellowish brown (10YR 5/4) fine sandy loam; massive; very friable; few fine flakes of mica; 10 percent, by volume, metasandstone channers; very strongly acid; clear wavy boundary.
C2—35 to 54 inches; very pale brown (10YR 8/2), yellowish brown (10YR 5/4), gray (10YR 6/1), and black (10YR 2/1) fine sandy loam; massive; very friable; few fine flakes of mica; 10 percent, by volume, metasandstone channers; very strongly acid; clear smooth boundary.
Cr—54 to 80 inches; weathered, strongly cemented metasandstone; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 40 to 60 inches
Depth to bedrock: 40 to 60 inches to weathered bedrock
Content of mica flakes: None or few

Content and size of rock fragments: Less than 35 percent, by volume; dominantly channers
Soil reaction: Extremely acid to strongly acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—clay loam, fine sandy loam, or loam
Thickness—7 to 20 inches

AB horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4
Texture (fine-earth fraction)—clay loam, fine sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

BC horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loamy fine sand, loamy sand, or loam

C horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—fine sandy loam, loam, sandy loam, loamy fine sand, or loamy sand saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Heintooga Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Colluvium derived from materials weathered from low-grade metasedimentary rock, such slate, phyllite, and thinly bedded metasandstone
Landscape: High mountains at Sandymush Bald in the northwestern part of the county
Landform: Coves and drainageways
Landform position: Footslopes and toeslopes
Slope range: 30 to 50 percent
Taxonomic classification: Loamy-skeletal, isotic, frigid Humic Dystrudepts

Typical Pedon

Heintooga very flaggy loam in an area of Chiltoskie-Heintooga-Horsetrough complex, 8 to 15 percent slopes, very stony (fig. 51); Swain County, North Carolina; from Bryson City, 9.9 miles east on U.S. Highway 19 to Cherokee, 2.8 miles north on U.S. Highway 441 and onto the Great Smoky Mountains National Parkway, 11.1 miles northeast on the Blue Ridge Parkway to Wolf Laurel Gap, 9.1 miles north on Balsam Mountain Road (Blue Ridge Parkway Extension) to Balsam Picnic area, 500 feet south-southeast of the parking area on a forested toeslope; Bunches Bald USGS

Figure 51.—Typical profile of Heintooga very flaggy loam. Heintooga soils are very deep, have thick, dark surface layers, have many rock fragments in the subsoil, and formed from local colluvium. They occur in coves and drainageways in the northwestern part of Buncombe County on high mountains in the Sandymush Bald area.

topographic quadrangle; lat. 35 degrees 34 minutes 17 seconds N. and long. 83 degrees 10 minutes 48 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed leaves, twigs, roots, and other coniferous plant material.

A1—1 to 4 inches; very dark brown (10YR 2/2) very flaggy loam, very dark grayish brown (10YR 3/2) dry; moderate fine to very coarse granular structure; very friable; common very fine and fine and many medium to very coarse roots throughout; common very fine to medium tubular pores; few fine flakes of mica; 25 percent, by volume, channers and 20 percent flagstones; ultra acid; abrupt wavy boundary.

A2—4 to 12 inches; dark brown (10YR 3/3) very flaggy loam, brown (10YR 4/3) dry; moderate very fine to coarse granular structure; friable; many medium to very

coarse roots throughout; common very fine to medium tubular pores; few fine flakes of mica; 25 percent, by volume, channers and 20 percent flagstones; extremely acid; gradual wavy boundary.

Bw1—12 to 25 inches; brown (10YR 4/3) extremely channery loam; moderate very fine to coarse subangular blocky structure; friable; common medium and coarse roots throughout; common very fine and fine and few medium pores; few fine flakes of mica; 60 percent, by volume, channers and 10 percent flagstones; extremely acid; gradual wavy boundary.

Bw2—25 to 80 inches; yellowish brown (10YR 5/6) extremely flaggy loam; weak fine to coarse subangular blocky structure; very friable; common medium to very coarse prominent yellowish red (5YR 4/6) mottles; few very fine tubular pores; few fine flakes of mica; 35 percent, by volume, channers and 35 percent flagstones; very strongly acid.

Range in Characteristics

Solum thickness: 40 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: None or few
Content and size of rock fragments: 35 to 80 percent, by volume, and typically increasing with depth; dominantly channers and flagstones
Soil reaction: Ultra acid to strongly acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam
Thickness—10 to 20 inches

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8; colors with value and chroma of 3 are derived from the parent material and not organic matter content
Texture (fine-earth fraction)—loam, coarse sandy loam, sandy loam, or fine sandy loam

Hemphill Series

Depth class: Very deep
Drainage class: Very poorly drained
Depth to seasonal high water table: 1.0 foot or less from December through May and 0.5 foot to 1.5 feet from June through November
Permeability: Moderately slow in the surface layer, slow in the subsoil, and moderate in the underlying material
Parent material: Alluvium derived from materials weathered from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of low mountains, dominantly in the central and southern parts of the county
Landform: Low stream terraces
Landform position: Planar to slightly concave bottomland slopes
Slope range: 0 to 3 percent
Taxonomic classification: Fine, mixed, active, mesic Umbric Endoaqualfs

Typical Pedon

Hemphill loam, 0 to 3 percent slopes, rarely flooded; Buncombe County, North Carolina; from Asheville, 0.8 mile south on U.S. Highway 25 (Biltmore Avenue), 1.8 miles southwest on U.S. Highway 25 (McDowell Avenue) to Biltmore Estate entrance,

1.0 mile west on an estate road paralleling the Swannanoa River, 0.25 mile south on a farm road, 750 feet west of the farm road in a cultivated field; Asheville USGS topographic quadrangle; lat. 35 degrees 33 minutes 35 seconds N. and long. 82 degrees 33 minutes 53 seconds W.; NAD27:

Ap1—0 to 7 inches; very dark gray (10YR 3/1) loam, dark grayish brown (10YR 4/2) dry; weak fine and medium granular structure; friable; nonsticky and nonplastic; common very fine and fine and few medium roots; common fine and few medium tubular pores; few fine and medium flakes of mica; slightly acid; clear smooth boundary.

Ap2—7 to 12 inches; very dark grayish brown (10YR 3/2) loam; weak medium granular structure; friable; nonsticky and nonplastic; common very fine and fine and few medium roots; common fine and few medium tubular pores; few fine and medium flakes of mica; slightly acid; clear smooth boundary.

BA—12 to 18 inches; dark gray (10YR 4/1) clay loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium granular structure; friable; slightly sticky, slightly plastic; common very fine and fine and few medium roots; common fine and few medium tubular pores; few faint clay films on faces of peds; few fine and medium flakes of mica; slightly acid; gradual wavy boundary.

Btg1—18 to 26 inches; gray (10YR 5/1) clay; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; common very fine and fine and few medium roots between peds; common fine and few medium tubular pores; few distinct clay films on faces of peds; few fine and medium flakes of mica; moderately acid; gradual wavy boundary.

Btg2—26 to 48 inches; gray (2.5Y 5/1) clay; common fine distinct brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; few very fine, fine, and medium roots between peds; few fine and medium tubular pores; few distinct clay films on faces of peds; common fine and medium flakes of mica; strongly acid; gradual wavy boundary.

BCg1—48 to 57 inches; gray (10YR 6/1) clay loam; common fine distinct brownish yellow (10YR 6/8) and few medium prominent strong brown (7.5YR 4/6) mottles; moderate coarse subangular blocky structure; friable; slightly sticky, slightly plastic; few fine and medium roots between peds; few fine and medium tubular pores; common fine and medium flakes of mica; moderately acid; gradual wavy boundary.

BCg2—57 to 80 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium platy structure; friable; nonsticky, nonplastic; few medium roots between peds; few fine tubular pores; common fine flakes of mica; moderately acid.

Range in Characteristics

Solum thickness: 40 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: None to common in the upper part of the profile and few to many in the lower part
Content and size of rock fragments: Less than 15 percent, by volume
Soil reaction: Very strongly acid to neutral throughout the profile

Ap horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 0 to 3
Texture (fine-earth fraction)—clay loam, silty clay loam, silt loam, or loam
Thickness of the A horizon—7 to 14 inches

AB or BA horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 0 to 3 or neutral in hue and value of 2 or 3
Texture (fine-earth fraction)—clay loam, silty clay loam, or sandy clay loam

Btg horizon:
Color—hue of 7.5YR to 5Y, value of 2 or 6, and chroma of 0 or 2; in some pedons, horizon has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—clay loam, silty clay loam, silty clay, or clay

BCg or CBg horizon (if it occurs):
Color—hue of 7.5YR to 5Y, value of 4 or 6, and chroma of 0 or 2 or neutral in hue and value of 1 or 2; in some pedons, horizon has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—sandy loam, fine sandy loam, sandy clay loam, loam, silt loam, silty clay loam, silty clay, clay loam, or clay

Cg horizon (if it occurs):
Color—hue of 7.5YR to 5Y, value of 2 to 6, and chroma of 0 to 2 or neutral in hue and value of 1 or 2; in some pedons, horizon has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—sand, sandy loam, fine sandy loam, sandy clay loam, loam, silt loam, or silty clay loam alluvium

Iotla Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Depth to seasonal high water table: 1.0 to 1.5 feet from December through May and 2.0 to 3.5 feet from June through November
Permeability: Moderately rapid
Parent material: Recent loamy alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountains valleys of intermountain hills; low and intermediate mountains, dominantly along Cane, Hominy, Reems, and Newfound Creeks and the French Broad and Swannanoa Rivers
Landform: Flood plains
Landform position: Planar to slightly concave bottomland slopes
Slope range: 0 to 2 percent
Taxonomic classification: Coarse-loamy, mixed, active, mesic Fluvaquentic Dystrudepts

Typical Pedon

Iotla loam, 0 to 2 percent slopes, occasionally flooded; Buncombe County, North Carolina; from Asheville, 2.1 miles south on U.S. Highway 25 (Biltmore Avenue) to Biltmore Village, 5.2 miles south on U.S. Highway 25-A, 4.1 miles southeast on Secondary Road 3116 (Mills Gap Road) to the intersection of Secondary Road 1336 (Cane Creek Road) and Secondary Road 3116 (Mills Gap Road), 650 feet east-southeast of the intersection and 450 feet north of Cane Creek, in a cultivated field;

USGS Fruitland topographic quadrangle; lat. 35 degrees 27 minutes 8.23 seconds N. and long. 82 degrees 28 minutes 33.67 seconds W.; NAD27:

Ap—0 to 8 inches; brown (10YR 4/3) loam, yellowish brown (10YR 5/4) dry; weak medium granular structure; very friable; many fine and very fine roots; common fine pores; common fine and medium flakes of mica; 2 percent, by volume, rounded quartz gravel; slightly acid; abrupt smooth boundary.

Bw1—8 to 19 inches; dark yellowish brown (10YR 4/4) sandy loam; few medium faint brown (10YR 5/3) and few medium distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; common fine and medium pores; common fine and medium flakes of mica; 2 percent, by volume, rounded quartz gravel; slightly acid; clear smooth boundary.

Bw2—19 to 31 inches; brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; few fine distinct reddish yellow (7.5YR 6/6) irregularly shaped masses of iron accumulation and common medium distinct dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) irregularly shaped iron depletions; few fine roots; few fine pores; common fine and medium flakes of mica; 3 percent, by volume, rounded quartz gravel; moderately acid; clear wavy boundary.

Bwg—31 to 47 inches; dark grayish brown (10YR 4/2) sandy loam; many medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; common fine and medium flakes of mica; strongly acid; abrupt wavy boundary.

Cg—47 to 53 inches; grayish brown (10YR 5/2) loamy sand; few light gray (10YR 7/1) mottles; massive; loose; 2 percent, by volume, rounded quartz gravel; common fine and medium flakes of mica; moderately acid; abrupt wavy boundary.

2Cg—53 to 81 inches; grayish brown (10YR 5/2) very gravelly sand; single grain; loose; few sand strata 1 to 3 inches thick; 40 percent, by volume, rounded quartz gravel and 5 percent rounded quartz cobbles; common fine and medium flakes of mica; moderately acid.

Range in Characteristics

Solum thickness: 40 to more than 60 inches

Depth to contrasting material: 40 to more than 60 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material

Depth to bedrock: More than 60 inches

Content of mica flakes: Common or many

Content and size of rock fragments: Less than 10 percent, by volume, in the upper part to a depth of 40 inches and 10 to 35 percent or more in the lower part; dominantly gravel or cobbles but may include stones

Soil reaction: Strongly acid to slightly acid throughout the profile, except where surface layers have been limed.

Ap or A horizon:

Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 1 to 4; where value is 3 or less, the A horizon is less than 7 inches thick

Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam; thin deposits of sandy material or surface scouring may occur in some pedons

Ab horizon (if it occurs):

Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 1 to 4

Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

Bw horizon:

Color—hue of 7.5YR to 2.5Y and value and chroma of 3 to 6

Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive,

or gray and iron accumulations in shades of red, brown, yellow, or olive in the lower part of horizon
Texture (fine-earth fraction)—fine sandy loam or sandy loam

Bwg horizon (if it occurs):
Color—hue of 10YR to 5Y, value of 3 to 5, and chroma of 1 or 2
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—fine sandy loam or sandy loam

Cg horizon:
Color—hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2; below a depth of 20 inches, some pedons have a horizon that has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 0 to 2
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam alluvium above a depth of 40 inches

2Cg horizon:
Color—hue of 7.5YR or 2.5Y and value and chroma of 3 to 6; below a depth of 20 inches, some pedons have a horizon that has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 0 to 2
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—below a depth of 40 inches textures are stratified with loamy sand, sand, and gravelly sand; some layers contain cobbles and a few stones

Jeffrey Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock, such interbedded metasandstone, phyllite, or quartzite
Landscape: Intermediate mountains in the northwestern (Sandymush Bald area) and southeastern parts of the county
Landform: Ridges, north- to east-facing hillslopes and mountain slopes, and those slopes shaded by the higher mountains
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Fine-loamy, isotic, mesic Humic Dystrudepts

Typical Pedon

Jeffrey loam in an area of Cheoah-Jeffrey complex, 30 to 50 percent slopes, stony; Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 4.1 miles north on North Carolina Highway 208 to Belva, 8.1 miles northeast on North Carolina Highway 212 to Hickey Fork, 1.2 miles northwest on Secondary Road 1310 to East Prong Hickey Fork, 1.8 miles northeast on U.S. Forest Service Road #465 and right on Little Prong, 2.2 miles northeast on U.S. Forest Service Road #465 to a gate at

Whiteoak Flats, 0.3 mile east on U.S. Forest Service Road #290, about 0.5 mile south on U.S. Forest Service Road #288, about 0.3 mile west on a logging road, 850 feet north of the road on a forested side slope; Greystone USGS topographic quadrangle; lat. 36 degrees 01 minute 10 seconds N. and long. 82 degrees 40 minutes 24 seconds W.; NAD27:

Oe—0 to 2 inches; moderately decomposed organic litter and root mat.
A1—2 to 6 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 4/3) dry; weak fine granular structure; very friable; many fine, common medium, and few very fine roots; few fine tubular pores; 10 percent, by volume, metasandstone and phyllite channers; very strongly acid; clear wavy boundary.
A2—6 to 10 inches; dark brown (10YR 3/3) loam, dark yellowish brown (10YR 4/4) dry; weak fine granular structure; very friable; common fine and medium roots; few fine tubular pores; 10 percent, by volume, metasandstone and phyllite channers; very strongly acid; clear wavy boundary.
Bw1—10 to 16 inches; dark yellowish brown (10R 4/6) channery loam; weak medium subangular blocky structure; friable; common distinct dark brown (10YR 3/3) organic matter staining on faces of peds; common very fine and fine and few medium roots; few fine tubular pores; 20 percent, by volume, metasandstone and phyllite channers; strongly acid; gradual wavy boundary.
Bw2—16 to 27 inches; dark yellowish brown (10YR 4/4) channery loam; weak medium subangular blocky structure; friable; few very fine, fine, and medium roots; few fine tubular pores; few very fine and fine flakes of mica; 20 percent, by volume, metasandstone and phyllite channers; strongly acid; clear wavy boundary.
Cr—27 to 33 inches; weathered, strongly cemented interbedded metasandstone and phyllite; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; gradual wavy boundary.
R—33 to 80 inches; unweathered, hard interbedded metasandstone and phyllite bedrock.

Range in Characteristics

Solum thickness: 18 to 35 inches
Depth to bedrock: 20 to 40 inches to hard bedrock
Content of mica flakes: None or few
Content and size of rock fragments: Less than 35 percent, by volume, in the A and B horizons and 15 to 50 percent in the C horizon; dominantly cobbles or gravel
Soil reaction: Strongly acid or very strongly acid throughout the profile

A horizon:
Color—hue of 7.5YR and value and chroma of 2 or 3
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy clay loam
Thickness—10 to 20 inches

Bw horizon:
Color—hue of 7.5YR, value of 4 or 5, and chroma of 3 to 6
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or sandy clay loam

C horizon (if it occurs):
Color—hue of 10YR, value of 4 or 5, and chroma of 4 to 6
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock
Excavation difficulty—moderate or high

Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, low-grade metasedimentary rock
Excavation difficulty—very high or extremely high

Junaluska Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock, such as metasandstone or phyllite
Landform: Ridges and mountain slopes of low and intermediate mountains, dominantly from south of Arden to Ridgecrest in the south-central and southeastern parts of the county
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Fine-loamy, mixed, subactive, mesic Typic Hapludults

Typical Pedon

Junaluska fine sandy loam in an area of Junaluska-Brasstown complex, 30 to 50 percent slopes; Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25, about 5.1 miles east on Interstate 240, about 12.2 miles east on Interstate 40 to Black Mountain and take Exit #64, about 5.7 miles south on North Carolina Highway 9, about 1.5 miles southwest on Secondary Road 2776 (Chestnut Hill Road), 0.2 mile north on a private drive, 0.25 mile northeast on a logging road, about 10 feet above a road cut on a forested side slope; Black Mountain USGS topographic quadrangle; lat. 35 degrees 33 minutes 59.5 seconds N. and long. 82 degrees 18 minutes 36.5 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.
A—1 to 4 inches; dark yellowish brown (10YR 4/4) fine sandy loam, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; common fine and medium and few coarse roots; 10 percent, by volume, channers; very strongly acid; clear smooth boundary.
BA—4 to 10 inches; strong brown (7.5YR 5/6) loam; weak fine subangular blocky structure; friable; common very fine, fine, and medium and few coarse roots; few fine tubular pores; 10 percent, by volume, channers; very strongly acid; clear wavy boundary.
Bt—10 to 22 inches; red (2.5YR 5/6) sandy clay loam; few fine distinct red (10R 4/8) and few fine distinct yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; friable; slightly sticky, slightly plastic; few very fine, fine, medium, and coarse roots; few fine tubular pores; few faint discontinuous yellowish red (5YR 4/6) clay films on faces of peds; few fine irregular black (5YR 2.5/1) manganese stains throughout; few fine flakes of mica; 10 percent, by volume, channers; very strongly acid; gradual wavy boundary.
BC—22 to 27 inches; yellowish red (5YR 5/6) loam; common medium distinct strong brown (7.5YR 4/6) and few fine prominent yellow (10YR 7/6) mottles; weak coarse subangular blocky structure; friable; few fine, medium, and coarse roots; few fine tubular pores; few fine irregular black (5YR 2.5/1) manganese stains throughout; few fine flakes of mica; 12 percent, by volume, channers; very strongly acid; gradual wavy boundary.

C—27 to 32 inches; yellowish red (5YR 5/8) channery loam; brown (10YR 5/3), red (2.5YR 4/6), and reddish brown (5YR 5/4) mottles; weak coarse subangular blocky structure; very friable; few fine roots; few fine irregular black (5YR 2.5/1) manganese stains throughout; few fine flakes of mica; 17 percent, by volume, channers; strongly acid; gradual wavy boundary.

Cr—32 to 81 inches; weathered, strongly cemented metasandstone; moderate or high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 15 to 39 inches
Depth to bedrock: 20 to 40 inches to weathered bedrock
Content of mica flakes: Few or common
Content and size of rock fragments: Less than 35 percent, by volume, in the A, B, and C horizons; dominantly channers, gravel, and flagstones
Soil reaction: Extremely acid to moderately acid throughout the profile

A or Ap horizon:
Color—hue of 10YR to 5YR, value of 3 to 5, and chroma of 3 to 8; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam or fine sandy loam

BA horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

Bt horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8; at least part of the horizon has hue of 2.5YR or 5YR
Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

BC horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

C or CB horizon (if it occurs):
Color—variegated in shades of red, brown, yellow, gray, or white
Texture (fine-earth fraction)—fine sandy loam, loam, sandy loam, or loamy fine sand
Other characteristics—thin parallel layers of saprolite and Bt horizon material may occur along fracture planes

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Kanuga Series

Depth class: Very deep
Drainage class: Moderately well drained
Depth to seasonal high water table: 2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Permeability: Moderately slow

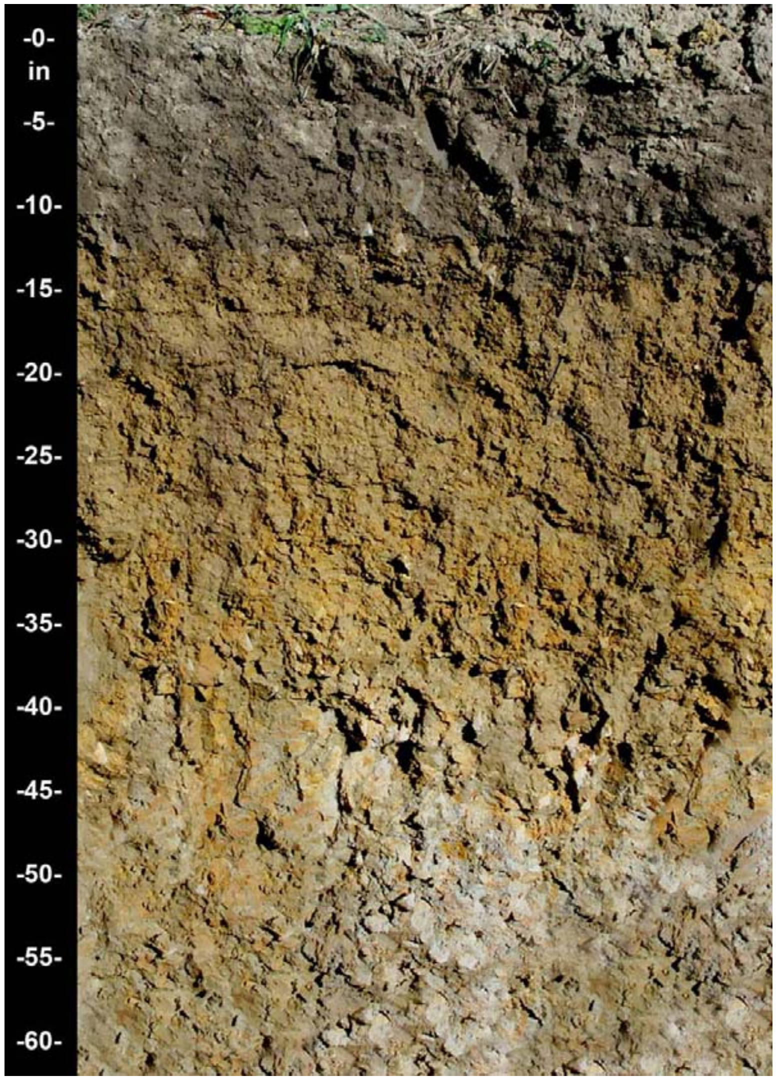

Figure 52.—Typical profile of Kanuga loam. Kanuga soils are very deep and formed from old alluvial deposits on high stream terraces. They occur in mountain valleys of intermountain hills and low mountains predominantly along large flood plains throughout the central and southern parts of Buncombe County.

Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of intermountain hills and low mountains, dominantly in the central and southern parts of the county
Landform: High stream terraces
Landform position: Benches
Slope range: 2 to 15 percent
Taxonomic classification: Fine, mixed, semiactive, mesic Aquic Hapludults

Typical Pedon

Kanuga loam in an area of Kanuga-Swannanoa complex, 2 to 8 percent slopes (fig. 52); Henderson County, North Carolina; from Hendersonville, 2.25 miles east on U.S. Highway 64 (Chimney Rock Road) to Interstate 26, about 5.8 miles west on

Interstate 26 to Exit #44, about 0.6 mile north on U.S. Highway 25, about 0.7 mile west on Secondary Road 1345 (Butler Bridge Road), 0.25 mile north on a private farm road (Tap Root Lane) to a second farm road to the left, 875 feet west on the farm road through a field, about 30 feet north of the farm road and about 400 feet north-northeast of the Root Dairy main complex, in a cultivated field; Skyland USGS topographic quadrangle; lat. 35 degrees 24 minutes 36.4 seconds N. and long. 82 degrees 31 minutes 47.1 seconds W.; NAD27:

Ap—0 to 12 inches; dark grayish brown (10YR 4/2) loam, dark yellowish brown (10YR 4/4) dry; moderate medium granular structure; friable; many very fine and fine and common medium roots; many very fine and fine and common medium tubular pores; less than 5 percent aerial coverage of very fine flakes of mica; 2 percent, by volume, rounded quartz gravel; neutral; clear smooth boundary.

Bt1—12 to 26 inches; dark yellowish brown (10YR 4/4) clay; moderate medium subangular blocky structure; firm, moderately sticky, moderately plastic; common very fine and fine roots; common very fine and fine tubular pores; common thin patchy discontinuous clay films on faces of peds; common medium faint dark grayish brown (10YR 4/2) iron depletions in linings of root channels; few fine and medium black (10YR 2/1) irregularly shaped masses of manganese concentrations between peds; 5 to 10 percent aerial coverage of very fine flakes of mica; 2 percent, by volume, rounded quartz gravel; neutral; clear wavy boundary.

Bt2—26 to 38 inches; yellowish brown (10YR 5/4) clay; strong medium to coarse subangular blocky structure; firm; very sticky, very plastic; few very fine and fine roots; few fine and coarse tubular pores; common continuous faint yellowish brown (10YR 5/6) clay films on faces of peds; many medium coarse prominent yellowish red (5YR 5/6) irregularly shaped masses of iron concentrations and few or common fine and medium light brownish gray (10YR 6/2) irregularly shaped iron depletions in the matrix; less than 5 percent aerial coverage of fine flakes of mica; 2 percent, by volume, rounded quartz gravel; very strongly acid; clear wavy boundary.

Btg—38 to 58 inches; light gray (2.5Y 7/1) clay; moderate medium subangular blocky structure; very firm; very sticky, very plastic; few very fine and fine roots; few fine and medium tubular pores; common continuous distinct light gray (10YR 7/2) clay films on faces of peds; common medium to coarse prominent yellowish red (5YR 5/6), common medium distinct yellowish brown (10YR 5/4), and few medium prominent brown (7.5YR 5/2) irregularly shaped masses of iron concentrations in the matrix; 5 percent aerial coverage of very fine and fine flakes of mica; 2 percent, by volume, rounded quartz gravel; extremely acid; clear wavy boundary.

BCg—58 to 68 inches; light brownish gray (10YR 6/2) gravelly sandy clay loam; weak fine to medium subangular blocky structure; friable; slightly sticky, slightly plastic; few discontinuous prominent reddish brown (5YR 4/4) clay films on faces of peds; common medium to coarse prominent yellowish red (5YR 5/6) and fine distinct yellowish brown (10YR 5/6) irregularly shaped masses of iron concentrations in the matrix; 10 percent aerial coverage of very fine and fine flakes of mica; 15 percent, by volume, rounded quartz gravel and 2 percent cobbles; extremely acid; clear wavy boundary.

Cg—68 to 91 inches; gray (7.5YR 6/1) very gravelly sandy clay loam; massive; friable; slightly sticky, slightly plastic; few discontinuous faint light brown (7.5YR 6/3) clay films on faces of peds; common distinct brownish yellow (10YR 6/8) irregularly shaped masses of iron concentrations in the matrix; less than 5 percent aerial coverage of fine flakes of mica; 30 percent, by volume, rounded gravel and 15 percent cobbles; extremely acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: None to many
Content and size of rock fragments: Less than 15 percent, by volume, in the A horizon and the upper part of the Bt horizon, less than 35 percent in the lower part of the Bt horizon and in the Btg and BCg horizons, and less than 60 percent in the Cg horizon; dominantly gravel and cobbles
Soil reaction: Extremely acid to moderately acid throughout the profile

A or Ap horizon:
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, silt loam, sandy clay loam, clay loam, or silty clay loam

E horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or silt loam

BE or BA horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6
Texture (fine-earth fraction)—sandy clay loam, clay loam, or silty clay loam

Bt horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Redoximorphic features—iron or clay depletions in shades of gray and iron accumulations in shades of red, brown, or yellow
Texture (fine-earth fraction)—clay, silty clay, clay loam, or silty clay loam

Btg or 2Btg horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 1 or 2
Redoximorphic features—iron or clay accumulations in shades of red, brown, or yellow
Texture (fine-earth fraction)—clay, silty clay, clay loam, or silty clay loam

BCg or 2BCg horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 0 to 2 or neutral in hue and value of 1 or 2; in some pedons, the horizon has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1 or 2
Redoximorphic features—iron or clay accumulations in shades of red, brown, or yellow
Texture (fine-earth fraction)—sandy clay loam, loam, silty clay loam, or clay loam

Cg or 2Cg horizon (if it occurs):
Color—hue of 7.5YR to 5Y, value of 4 to 8, and chroma of 1 or 2 or neutral in hue and value of 1 or 2; in some pedons, the horizon has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1 or 2
Redoximorphic features—iron or clay accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loam, silt loam, clay loam, silty clay loam, silty clay, or clay

Lauada Series

Depth class: Moderately deep
Drainage class: Well drained

Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Residuum affected by soil creep in the upper part, weathered from high-grade metamorphic rock with a high mica content, such as mica schist or mica gneiss
Landscape: Intermountain hills and low and intermediate mountains dominantly in the south-central and southeastern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 30 percent
Taxonomic classification: Fine-loamy, micaceous, mesic Typic Hapludults

Typical Pedon

Lauada sandy clay loam in an area of Fannin-Lauada complex, 8 to 15 percent slopes, moderately eroded; Buncombe County, North Carolina; from Asheville, 2.1 miles south on U.S. Highway 25 (Biltmore Avenue) to Biltmore Village, 5.75 miles south on U.S. Highway 25-A (Sweeten Creek Road), 3.1 miles southeast on Secondary Road 3116 (Mills Gap Road), about 0.25 mile northwest on a private gated farm road, in a hayfield; Fruitland USGS topographic quadrangle; lat. 35 degrees 28 minutes 16.2 seconds N. and long. 82 degrees 29 minutes 07.6 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.
Ap—1 to 6 inches; brown (7.5YR 4/4) sandy clay loam, light brown (7.5YR 6/4) dry; weak medium granular structure; friable; common very fine and fine roots; common very fine and fine vesicular pores; 25 percent aerial coverage of fine and medium flakes of mica; 5 percent, by volume, gravel; very strongly acid; clear smooth boundary.
BA—6 to 11 inches; strong brown (7.5YR 4/6) sandy clay loam; weak moderate subangular blocky structure; friable; common very fine and fine roots; common very fine and fine vesicular pores; 25 to 35 percent aerial coverage of fine and medium flakes of mica; 5 percent, by volume, gravel; very strongly acid; clear wavy boundary.
Bt1—11 to 20 inches; reddish brown (5YR 4/4) clay loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; common very fine and fine and few coarse tubular pores; common distinct reddish yellow (5YR 6/6) clay films on faces of peds; 35 to 40 percent aerial coverage of fine and medium flakes of mica; 5 percent, by volume, gravel; very strongly acid; gradual wavy boundary.
Bt2—20 to 28 inches; yellowish red (5YR 4/6) clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine tubular pores; many very fine mica flakes; 5 percent, by volume, gravel; strongly acid; clear smooth boundary.
BC—28 to 33 inches; yellowish red (5YR 5/6) loam; weak fine subangular blocky structure; very friable; few coarse and common fine and medium roots; few very fine tubular pores; very few faint reddish brown (5YR 4/4) clay films in root channels and pores; 45 to 50 percent aerial coverage of fine and medium flakes of mica; 5 percent, by volume, gravel; strongly acid; clear smooth boundary.
C—33 to 37 inches; strong brown (7.5YR 5/6) sandy loam saprolite; massive; very friable; few medium and coarse roots; few very fine tubular pores; 45 to 50 percent aerial coverage of fine and medium flakes of mica; 5 percent, by volume, gravel; strongly acid; gradual wavy boundary.
Cr—37 to 81 inches; weathered, strongly cemented mica schist; moderate or high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 15 to 39 inches
Depth to bedrock: 20 to 40 inches to weathered bedrock; more than 60 inches to hard bedrock
Content of mica flakes: Common or many in the A horizon and the upper part of the B horizon and many in the lower part of the B horizon and in the C horizon
Content and size of rock fragments: Less than 35 percent, by volume, throughout the profile; dominantly gravel or cobbles
Soil reaction: Very strongly acid to moderately acid throughout the profile

Ap horizon:
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4; where value is 3 or less, the A horizon is less than 7 inches thick; in moderately eroded pedons horizon has hue of 5YR or 7.5YR, value of 3 to 5, and chroma of 4 to 8
Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam; sandy clay loam or clay loam in eroded pedons

BA horizon (if it occurs):
Color—hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6
Texture (fine-earth fraction)—loam, fine sandy loam, or loam

Bt horizon:
Color—hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8
Mottles—shades of red, brown, and yellow
Texture (fine-earth fraction)—loam, sandy clay loam, or clay loam

BC horizon (if it occurs):
Color—hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6
Mottles—shades of red, brown, and yellow
Texture (fine-earth fraction)—sandy clay loam, loam, fine sandy loam, or sandy loam

C horizon (if it occurs):
Color—hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8
Mottles—shades of red, brown, and yellow
Texture (fine-earth fraction)—fine sandy loam, sandy loam, loam, loamy sand, or loamy fine sand saprolite

Cr layer:
Type of bedrock—weathered, micaceous, weakly to strongly cemented, high-grade metamorphic rock, such as mica schist or mica gneiss
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Mars Hill Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock, such as migmatitic gneiss
Landscape: Low and intermediate mountains, dominantly in the north-central part of the county

Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, superactive, mesic Dystric Eutrudepts

Typical Pedon

Mars Hill fine sandy loam in an area of Walnut-Oteen-Mars Hill complex, 30 to 50 percent slopes, moderately eroded; Madison County, North Carolina; from Mars Hill, 4.3 miles south on Secondary Road 1001, about 1.2 miles southeast on Secondary Road 1114, about 0.5 mile east on Secondary Road 1116, about 0.3 mile southeast on Secondary Road 1115, about 0.3 mile northeast on a farm road to a gate, 200 feet northeast on a north-facing convex slope of 34 percent, in a pasture; Leicester USGS topographic quadrangle; lat. 35 degrees 44 minutes 15 seconds N. and long. 82 degrees 40 minutes 47 seconds W.; NAD27:

Ap1—0 to 3 inches; dark yellowish brown (10YR 4/4) fine sandy loam, brown (10YR 5/3) dry; weak medium granular structure; very friable; common very fine roots throughout; few fine and medium interstitial and tubular pores; few fine flakes of mica; 5 percent, by volume, migmatitic gneiss gravel; strongly acid; abrupt smooth boundary.

Ap2—3 to 9 inches; dark yellowish brown (10YR 4/4) fine sandy loam, brown (10YR 5/3) dry; common medium distinct yellowish brown (10YR 5/6) mottles in interior of peds; weak coarse subangular blocky structure; very friable; common very fine roots throughout; few fine and medium tubular pores; common fine flakes of mica; 10 percent, by volume, migmatitic gneiss gravel; strongly acid; clear smooth boundary.

Bw1—9 to 16 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak fine subangular blocky structure; very friable; few very fine roots; few fine and medium tubular pores; common fine flakes of mica; 2 percent, by volume, migmatitic gneiss gravel; moderately acid; gradual wavy boundary.

Bw2—16 to 23 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak fine subangular structure; very friable; few very fine roots; few fine and medium tubular pores; common fine flakes of mica; 1 percent, by volume, migmatitic gneiss gravel; moderately acid; gradual wavy boundary.

BC—23 to 35 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak medium subangular blocky structure; very friable; few very fine roots; few very fine and fine tubular pores; common fine flakes of mica; 1 percent, by volume, migmatitic gneiss gravel; strongly acid; gradual irregular boundary.

C—35 to 46 inches; dark yellowish brown (10YR 4/6) fine sandy loam; massive; very friable; few very fine roots; few very fine and fine tubular pores; 2 percent, by volume, migmatitic gneiss gravel; strongly acid; clear irregular boundary.

Cr—46 to 80 inches; weathered, strongly cemented migmatitic gneiss; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 20 to 40 inches
Depth to bedrock: 40 to 60 inches to weathered bedrock
Content of mica flakes: Few or common
Content and size of rock fragments: 0 to 35 percent in the A and B horizons and 0 to 40 percent in the C horizon; dominantly gravel
Soil reaction: Very strongly acid to neutral in the A horizon and strongly acid to neutral in the B and C horizons

A or Ap horizon:
Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y and value and chroma of 4 to 6
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

BC horizon:
Color—horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 6 or may be mixed or mottled in these colors
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

C horizon:
Color—horizon has hue of 7.5YR to 5Y and value and chroma of 4 to 6 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, mixed felsic and mafic, high-grade metamorphic rock, such as migmatitic gneiss, biotite-hornblende gneiss, and amphibolite
Excavation difficulty—moderate or high
Other characteristcs—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, mixed felsic and mafic, high-grade metamorphic rock, such as migmatitic gneiss, biotite-hornblende gneiss, and amphibolite

Maymead Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Colluvium derived from low-grade metasedimentary rock, such as metasandstone and phyllite
Landscape: Low and intermediate mountains, dominantly from south of Arden to Ridgecrest in the south-central and southeastern parts of the county
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Slope range: 15 to 50 percent
Taxonomic classification: Coarse-loamy, mixed, semiactive, mesic Typic Dystrudepts

Typical Pedon

Maymead loam in an area of Northcove-Maymead complex, 15 to 30 percent slopes, very stony; Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 4.1 miles north on North Carolina Highway 208 to Belva, 8.1 miles northeast on North Carolina Highway 212 to Hickey Fork, 1.2 miles northwest on Secondary Road 1310 to East Prong Hickey Fork, 1.8 miles northeast on U.S. Forest Service Road #465, about 0.4 mile north on U.S. Forest Service Road #293 along East Prong Hickey Fork, 0.4 mile west on Whiteoak Flat Trail to a parking area, 75 feet east in a forested convex

area between drainageways; Greystone USGS topographic quadrangle; lat. 36 degrees 00 minutes 56 seconds N. and long. 82 degrees 41 minutes 56 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.

A—1 to 5 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 4/3) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; many very fine and fine tubular pores; 5 percent, by volume, channers and 3 percent cobbles; very strongly acid; clear smooth boundary.

Bw1—5 to 11 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; friable; common very fine, fine, and medium roots; common very fine and fine tubular pores; 5 percent, by volume, channers and 5 percent cobbles; very strongly acid; clear wavy boundary.

Bw2—11 to 34 inches; strong brown (7.5YR 4/6) channery loam; weak medium subangular blocky structure; friable; common very fine and fine roots; common very fine and fine tubular pores; 12 percent, by volume, channers and 6 percent cobbles; very strongly acid; gradual wavy boundary.

Bw3—34 to 47 inches; strong brown (7.5YR 5/8) cobbly sandy loam; weak fine subangular blocky structure; very friable; few fine roots; common very fine and fine tubular pores; 10 percent, by volume, channers, 10 percent cobbles, and 5 percent flagstones; very strongly acid; gradual wavy boundary.

Bw4—47 to 80 inches; brown (7.5YR 5/4) very flaggy sandy loam; weak medium subangular blocky structure; very friable; few very fine and common fine roots; few very fine and common fine tubular pores; 10 percent, by volume, channers, 10 percent cobbles, and 20 percent flagstones; strongly acid.

Range in Characteristics

Solum thickness: 40 to 70 inches

Depth to bedrock: More than 40 inches

Content of mica flakes: None

Content and size of rock fragments: Less than 35 percent, by volume, to a depth of 40 inches and less than 60 percent below a depth of 40 inches; ranging from channers to boulders; size and number of coarse fragments generally increase with depth

Soil reaction: Very strongly acid or strongly acid throughout the profile

A horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 2 or 3; where value is 3 or less, the horizon is less than 7 inches thick

Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

E horizon (if it occurs):

Color—hue of 10YR, value of 4 or 5, and chroma of 4 to 6

Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

Bw horizon:

Color—hue of 7.5YR to 10YR, value of 4 or 5, and chroma of 4 to 8

Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam; some pedons have thin subhorizons of sandy clay loam or clay loam

C horizon (if it occurs):

Color—variegated in shades of brown, yellow, black, or gray

Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, loamy sand, loamy fine sand, or coarse sandy loam colluvium

Micaville Series

Depth class: Deep
Drainage class: Somewhat excessively drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from high-grade metamorphic rocks having a high mica content, such as mica schist and mica gneiss
Landscape: Low and intermediate mountains, dominantly in the south-central and southeastern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, micaceous, mesic Typic Dystrudepts

Typical Pedon

Micaville sandy loam in an area of Micaville-Brownville complex, 50 to 95 percent slopes, stony; Buncombe County, North Carolina; from Asheville, 2.1 miles south on U.S. Highway 25 (Biltmore Avenue) to Biltmore Village, 5.75 miles south on U.S. Highway 25-A (Sweeten Creek Road), about 1.0 mile southeast on Secondary Road 3116 (Mills Gap Road), 1.6 miles east on Secondary Road 3150 (Concord Road), 0.5 mile north on Secondary Road 3119 (Merrill Cove Road), about 1.5 miles northwest on a private road (Merrill Chase Road), on an east-facing road cut on a forested side slope; Oteen USGS topographic quadrangle; lat. 35 degrees 30 minutes 02.2 seconds N. and long. 82 degrees 29 minutes 12.5 seconds W.; NAD27:

Oe—0 to 2 inches; moderately decomposed organic litter and root mat.
A—2 to 6 inches; dark yellowish brown (10YR 3/4) sandy loam, yellowish brown (10YR 5/4) dry; weak fine granular structure; very friable; many fine to coarse roots; many fine and medium and few coarse tubular pores; few fine flakes of mica; 10 percent, by volume, gravel and channers; very strongly acid; clear smooth boundary.
BA—6 to 9 inches; dark yellowish brown (10YR 4/6) sandy loam; weak medium subangular blocky structure; friable; common fine to coarse roots; common fine and few medium and coarse tubular pores; common fine flakes of mica; 10 percent, by volume, gravel and channers; very strongly acid; clear wavy boundary.
Bw1—9 to 28 inches; yellowish brown (10YR 5/6) sandy loam; moderate coarse subangular blocky structure; friable; common fine to coarse roots; common very fine and fine tubular pores; few medium and many fine flakes of mica; 10 percent, by volume, gravel and channers; very strongly acid; clear wavy boundary.
Bw2—28 to 41 inches; strong brown (7.5YR 5/8) sandy loam; moderate coarse subangular blocky structure; friable; few fine to coarse roots; few very fine or fine tubular and vesicular pores; many fine flakes of mica; 5 percent, by volume, gravel; strongly acid; clear wavy boundary.
BC—41 to 54 inches; yellowish brown (10YR 5/8) gravelly sandy loam; weak coarse subangular blocky structure; very friable; few fine to coarse roots; few very fine tubular and vesicular pores; common medium and many fine flakes of mica; 20 percent, by volume, gravel; strongly acid; abrupt wavy boundary.
Cr—54 to 81 inches; weathered, strongly cemented mica schist; moderate or high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 20 to 55 inches

Depth to bedrock: 40 to 60 inches to weathered bedrock; more than 60 inches to hard bedrock
Content of mica flakes: Few to many in the A horizon and many in the B and C horizons
Content and size of rock fragments: 5 to less than 35 percent, by volume; dominantly gravel and channers but including cobbles and stones
Soil reaction: Extremely acid to moderately acid throughout the profile, except where surface layers have been limed

A or Ap horizon:
Color—hue of 7.5YR to 10YR, value of 2 to 5, and chroma of 1 to 4; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—coarse sandy loam, sandy loam, fine sandy loam, or loam

BA or BE horizon (if it occurs):
Color—hue of 7.5YR to 10YR, value of 3 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—coarse sandy loam, sandy loam, fine sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—coarse sandy loam, sandy loam, fine sandy loam, or loam

BC or CB horizon (if it occurs):
Color—hue of 7.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—loamy coarse sand, loamy sand, loamy fine sand, coarse sandy loam, sandy loam, fine sandy loam, or loam

C horizon (if it occurs):
Color—horizon has hue of 5YR to 10YR, value of 3 to 8, and chroma of 2 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loamy sand, coarse sandy loam, sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, micaceous, weakly to strongly cemented, high-grade metamorphic rock such as mica schist or mica gneiss
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Nikwasi Series

Depth class: Very deep
Drainage class: Very poorly drained
Depth to seasonal high water table: 1.0 foot or less from December through May and 0.5 foot to 1.5 feet from June through November
Permeability: Moderately rapid in the surface horizon and the upper portion of the underlying material and rapid in the lower portion
Parent material: Recent alluvium that is loamy in the upper part and sandy or sandy-skeletal in the lower part, derived from material weathered from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of low and intermediate mountains, scattered throughout the county
Landform: Flood plains

Landform position: Planar to slightly concave bottomland slopes
Slope range: 0 to 2 percent
Taxonomic classification: Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid, mesic Cumulic Humaquepts

Typical Pedon

Nikwasi loam, 0 to 2 percent slopes, frequently flooded; Buncombe County, North Carolina; from Asheville, 0.3 mile north on U.S. Highway 25 (Biltmore Avenue), 4.9 miles southwest on Interstate 240 to the Interstate 240, 40, and 26 interchange, 6.3 miles south on Interstate 26 East to Exit #37, about 1.6 miles southwest on North Carolina Highway 146 (Long Shoals Road), 0.2 mile south on North Carolina Highway 191 (Brevard Road), 1.3 miles southwest on Secondary Road 3496 (Avery Creek Road), 1.1 miles south on Secondary Road 3492 (Powder Creek Road), 525 feet east of the road in a cultivated field; Skyland USGS topographic quadrangle; lat. 35 degrees 26 minutes 37.6 seconds N. and long. 82 degrees 35 minutes 54.9 seconds W.; NAD27:

A1—0 to 14 inches; black (10YR 2/1) loam, very dark grayish brown (10YR 3/2) dry; weak fine granular structure; very friable; many very fine, fine, and medium and few coarse roots throughout; common fine and medium pores; common very fine flakes of mica; 5 percent, by volume, rounded quartz gravel; moderately acid; clear smooth boundary.

A2—14 to 26 inches; very dark gray (10YR 3/1) sandy loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; very friable; common very fine, fine, and medium and few coarse roots throughout; common fine and medium pores; common very fine flakes of mica; 5 percent, by volume, rounded quartz gravel; strongly acid; clear wavy boundary.

AC—26 to 34 inches; very dark grayish brown (10YR 3/2) gravelly loamy sand; moderate medium granular structure; friable; common very fine, fine, and medium and few coarse roots throughout; common fine and medium pores; common very fine flakes of mica; 12 percent, by volume, rounded quartz gravel and 5 percent cobbles; strongly acid; clear wavy boundary.

Cg1—34 to 47 inches; dark grayish brown (10YR 4/2) very gravelly loamy sand; massive; very friable; few fine faint very dark gray (10YR 3/1) irregularly shaped iron depletions with clear boundaries throughout; few fine and medium roots throughout; common very fine and fine flakes of mica; 25 percent, by volume, well rounded gravel and 12 percent cobbles; strongly acid; gradual wavy boundary.

Cg2—47 to 65 inches; dark gray (10YR 4/1) very cobbly loamy coarse sand; single grain; loose; few medium prominent brownish gray (10YR 5/2) irregularly shaped iron depletions with clear boundaries throughout; common medium distinct strong brown (7.5YR 4/6) irregularly shaped masses of iron accumulation with clear boundaries in the matrix; few medium roots throughout; few very fine and fine flakes of mica; 10 percent, by volume, rounded quartz gravel; 25 percent cobbles and 5 percent stones; strongly acid; clear wavy boundary.

Cg3—65 to 82 inches; variegated dark grayish brown (10YR 4/2), light brownish gray (2.5Y6/2), and dark gray (7.5YR 4/1) very gravelly sand; single grain; loose; common very fine, fine, and medium flakes of mica; 45 percent, by volume, gravel and 10 percent cobbles; strongly acid.

Range in Characteristics

Depth to contrasting material: 24 to 40 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few to many

Content and size of rock fragments: 5 to 35 percent in the A and AC horizons and 35 to 80 percent in the Cg horizons; dominantly well rounded gravel or cobbles
Soil reaction: Very strongly acid to slightly acid throughout the profile

A or Ap horizon:
Color—hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 to 3 or neutral in hue and value of 2 or 3; dry value is less than 5
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam
Thickness of the A horizon—more than 24 inches

AC horizon (if it occurs):
Color—hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 to 3 or neutral in hue and value of 2 or 3
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loamy sand, loamy fine sand, loamy coarse sand, sand, or coarse sand

Cg horizon:
Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 2 or neutral in hue and value of 4 to 7
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, or coarse sandy loam alluvium
Other characteristics—horizon is at or below the free water table and is continually saturated year-round

Northcove Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Colluvium derived from low-grade metasedimentary rock, such as metasandstone, phyllite, or quartzite
Landscape: Low and intermediate mountains, dominantly from south of Arden to Ridgecrest in the south-central and southeastern parts of the county
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Slope range: 15 to 50 percent
Taxonomic classification: Loamy-skeletal, mixed, semiactive, mesic Typic Dystrudepts

Typical Pedon

Northcove very cobbly loam in an area of Northcove-Maymead complex, 15 to 30 percent slopes, very stony; Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 4.1 miles north on North Carolina Highway 208 to Belva, 8.1 miles northeast on North Carolina Highway 212 to Hickey Fork, 1.2 miles northwest on Secondary Road 1310 to East Prong Hickey Fork, 1.8 miles northeast on U.S. Forest Service Road #465, about 0.4 mile north on U.S. Forest Service Road #293 along

East Prong Hickey Fork, 0.4 mile west on Whiteoak Flat Trail to a parking area, 85 feet northwest in a forested area near Big Rocky Branch; Greystone USGS topographic quadrangle; lat. 36 degrees 00 minutes 57 seconds N. and long. 82 degrees 41 minutes 58 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.

A—1 to 4 inches; dark brown (10YR 3/3) very cobbly loam, dark yellowish brown (10YR 4/4) dry; weak fine granular structure; very friable; many very fine and fine and common medium roots; few fine and medium tubular pores; 15 percent, by volume, gravel, 20 percent cobbles, and 5 percent stones; very strongly acid; gradual smooth boundary.

BA—4 to 8 inches; dark yellowish brown (10YR 4/4) very cobbly loam; weak coarse subangular blocky structure; very friable; common very fine, fine, and medium roots; few fine tubular pores; 15 percent, by volume, gravel, 20 percent cobbles, and 5 percent stones; very strongly acid; gradual wavy boundary.

Bw1—8 to 29 inches; dark yellowish brown (10YR 4/6) very cobbly loam; weak medium subangular blocky structure; friable; common fine roots; few fine tubular pores; 15 percent, by volume, gravel, 20 percent cobbles, and 10 percent stones; very strongly acid; gradual wavy boundary.

Bw2—29 to 56 inches; brownish yellow (10YR 6/6) very cobbly loam; weak medium subangular blocky structure; very friable; common fine and few medium roots; 15 percent, by volume, gravel, 25 percent cobbles, and 15 percent stones; very strongly acid; gradual wavy boundary.

C—56 to 80 inches; light yellowish brown (10YR 6/4) very cobbly sandy loam; massive; very friable; few fine roots; few very fine and fine flakes of mica; 10 percent, by volume, gravel, 25 percent cobbles, and 20 percent stones; very strongly acid.

Range in Characteristics

Solum thickness: 35 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: None
Content and size of rock fragments: 35 to 60 percent, by volume, in the A and B horizons and 35 to 80 percent in the C horizon; typically increasing in amount with depth; ranging from channers to boulders
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—hue of 10YR or 7.5YR, value of 2 or 5, and chroma of 2 to 4; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

BA or AB horizon (if it occurs):
Color—hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

Bw horizon:
Color—horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

BC horizon (if it occurs):
Color—horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loam or fine sandy loam

C horizon:

Color—horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors

Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loamy sand colluvium

Oconaluftee Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate in the surface layer and moderately rapid in the subsoil and underlying material
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock, such slate, phyllite, and thinly bedded metasandstone
Landscape: High mountains at Sandymush Bald in the northwestern part of the county
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, frigid Humic Dystrudepts

Typical Pedon

Oconaluftee channery loam, windswept, 50 to 95 percent slopes; Jackson County, North Carolina; from Sylva, 0.6 mile north on Secondary Road 1513 (Grindstaff Cove Road), 10.85 miles northeast on U.S. Highway 74 & 23 to Balsam Gap on the Haywood County line, 16.5 miles south on the Blue Ridge Parkway to the west end of Bunches Bald tunnel, 400 feet south of the parkway on a forested side slope; Bunches Bald USGS topographic quadrangle; lat. 35 degrees 30 minutes 50 seconds N. and long. 83 degrees 11 minutes 36 seconds W.; NAD27:

Oe—0 to 2 inches; moderately decomposed organic litter and root mat.

A1—2 to 8 inches; black (10YR 2/1) channery loam, very dark grayish brown (10Y 3/2) dry; weak fine granular structure; very friable; many fine and medium roots throughout; many very fine and fine tubular and interstitial pores; common very fine and fine flakes of mica; 25 percent, by volume, phyllite and metasandstone channers and flagstones; extremely acid; clear wavy boundary.

A2—8 to 19 inches; dark brown (10YR 3/3) channery loam, brown (10YR 5/3) dry; weak medium granular structure; very friable; common fine and medium roots throughout; common very fine and fine tubular and interstitial pores; common very fine and fine flakes of mica; 20 percent, by volume, phyllite and metasandstone channers; strongly acid; clear wavy boundary.

Bw—19 to 35 inches; dark yellowish brown (10YR 4/4) channery fine sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots between peds; few very fine and fine tubular and interstitial pores; common fine flakes of mica; 20 percent, by volume, phyllite and metasandstone channers; very strongly acid; gradual wavy boundary.

C—35 to 80 inches; olive brown (2.5Y 4/4), white (10YR 8/2), gray (10YR 6/1), and black (10YR 2/1) channery fine sandy loam saprolite; massive; few fine and medium roots between peds in cracks; few very fine and fine tubular pores; common fine flakes of mica; 20 percent, by volume, phyllite and metasandstone channers; strongly acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common in the upper 40 inches of the profile
Content and size of rock fragments: Less than 35 percent, by volume; dominantly channers and flagstones
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—loam, fine sandy loam, or clay loam
Thickness—10 to 20 inches

AB horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4
Texture (fine-earth fraction)—loam, fine sandy loam, or silt loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—fine sandy loam, loam, or silt loam

BC horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, or silt loam

C horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—fine sandy loam, loam, silt loam, sandy loam, loamy fine sand, or loamy sand saprolite

Oteen Series

Depth class: Shallow
Drainage class: Somewhat excessively drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic, high-grade metamorphic or igneous rock, such as migmatitic gneiss
Landscape: Low and intermediate mountains, dominantly in the north-central part of the county
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Loamy, mixed, superactive, mesic, shallow Dystric Eutrudepts

Typical Pedon

Oteen fine sandy loam in an area of Walnut-Oteen-Mars Hill complex, 30 to 50 percent slopes, moderately eroded; Madison County, North Carolina; from Marshall, 4.3 miles south on Secondary Road 1001, about 1.2 miles southwest on Secondary Road 1114, about 0.5 mile northeast on Secondary Road 1116, about 0.3 mile east on Secondary Road 1115, about 0.3 mile northeast on a farm road to a gate, 500 feet northeast on a west-facing convex slope of 45 percent, in a pasture; Leicester USGS

topographic quadrangle; lat. 35 degrees 44 minutes 17 seconds N. and long. 82 degrees 40 minutes 42 seconds W.; NAD27:

Ap—0 to 2 inches; dark brown (10YR 3/3) fine sandy loam, yellowish brown (10YR 5/4) dry; weak fine granular structure; very friable; common very fine roots throughout; few fine and medium interstitial pores; common fine flakes of mica; 2 percent, by volume, migmatitic gneiss gravel; very strongly acid; clear smooth boundary.
Bw—2 to 11 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine subangular blocky structure; very friable; common very fine roots throughout; few fine and medium interstitial pores; common fine flakes of mica; 10 percent, by volume, migmatitic gneiss gravel; strongly acid; clear wavy boundary.
C—11 to 15 inches; dark yellowish brown (10YR 4/4) very gravelly sandy loam saprolite; massive; very friable; few very fine roots throughout; common medium interstitial pores; common fine flakes of mica; 38 percent, by volume, migmatitic gneiss gravel; moderately acid; gradual irregular boundary.
Cr—15 to 42 inches; weathered, strongly cemented migmatitic gneiss; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; gradual wavy boundary.
R—42 to 80 inches; unweathered, hard migmatitic gneiss bedrock.

Range in Characteristics

Solum thickness: 10 to 20 inches
Depth to bedrock: 10 to 20 inches to weathered bedrock
Content of mica flakes: Few or common
Content and size of rock fragments: 0 to 35 percent in the A and B horizons and 0 to 40 percent in the C horizon
Soil reaction: Strongly acid to neutral throughout the profile

A or Ap horizon:
Color—hue of 7.5YR to 2.5Y and value and chroma of 2 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y and value and chroma of 4 to 6
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

C horizon:
Color—hue of 7.5YR to 5Y and value and chroma of 4 to 6
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, mixed felsic and mafic, high-grade metamorphic rock, such as migmatitic gneiss, biotite-hornblende gneiss, and amphibolite
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, mixed felsic and mafic, high-grade metamorphic rock, such as migmatitic gneiss, biotite-hornblende gneiss, and amphibolite

Porters Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock, such as granite and biotite gneiss
Landscape: Low and intermediate mountains in the western and eastern parts of the county
Landform: Ridges, north- to east-facing mountain slopes, and those slopes shaded by the higher mountains
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, mesic Typic Dystrudepts

Typical Pedon

Porters loam in an area of Porters-Unaka loam, 50 to 95 percent slopes, rocky; Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25, about 1.0 mile west on Interstate 240, about 12.6 miles north on Interstate 26 to Exit #15 (Barnardsville exit), 15.4 miles northeast on North Carolina Highway 197 to Cane River Gap on the Yancey County line, about 0.4 mile south on a gated U.S. Forest Service road, 10 feet above the road on a forested side slope; Mt. Mitchell USGS topographic quadrangle; lat. 35 degrees 48 minutes 24.9 seconds N. and long. 82 degrees 21 minutes 0.5 second W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.
A1—1 to 5 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) and brown (10YR 5/3) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; common very fine and fine tubular pores; few very fine flakes of mica; 5 percent, by volume, gravel and 3 percent cobbles; very strongly acid; clear smooth boundary.
A2—5 to 9 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; weak medium granular structure; very friable; many very fine and fine, common medium, and few coarse roots; common very fine and fine tubular pores; few very fine flakes of mica; 5 percent, by volume, gravel and 3 percent cobbles; very strongly acid; clear wavy boundary.
BA—9 to 12 inches; dark yellowish brown (10YR 4/4) sandy loam; weak fine subangular blocky structure; friable; common very fine and few medium roots; few fine tubular pores; few very fine flakes of mica; 5 percent, by volume, gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.
Bw1—12 to 28 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak medium subangular blocky structure; friable; common very fine and few medium roots; few fine tubular pores; few very fine flakes of mica; 5 percent, by volume, gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.
Bw2—28 to 41 inches; yellowish brown (7.5YR 5/6) gravelly sandy loam; weak medium subangular blocky structure; friable; few very fine and fine flakes of mica; 12 percent, by volume, gravel and 4 percent cobbles; very strongly acid; gradual wavy boundary.
BC—41 to 48 inches; brown (7.5YR 5/4) cobbly sandy loam; weak coarse subangular blocky structure; friable; few very fine flakes of mica; 5 percent, by volume, gravel, 10 percent cobbles, and 5 percent stones; very strongly acid; gradual wavy boundary.
C—48 to 53 inches; mottled brown (10YR 4/3) and grayish brown (10YR 5/2) sandy

loam biotite gneiss saprolite; massive; friable; few very fine flakes of mica; 3 percent, by volume, gravel, 2 percent cobbles, and 5 percent stones; very strongly acid; abrupt wavy boundary.

Cr—53 to 58 inches; weathered, strongly cemented biotite gneiss; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; abrupt smooth boundary.

R—58 to 81 inches; unweathered, hard biotite gneiss bedrock.

Range in Characteristics

Solum thickness: 20 to 50 inches

Depth to bedrock: 40 to 60 inches to hard bedrock

Content of mica flakes: Few or common in the A and B horizons and few to many in the C horizon

Content and size of rock fragments: Less than 15 percent, by volume, in the A horizon and the upper Bw horizon and less than 35 percent in the lower Bw horizon; ranging from gravel to stones

Soil reaction: Very strongly acid to slightly acid throughout the profile

A horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3

Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

Thickness—7 to 10 inches

AB horizon (if it occurs):

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4

Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

BA horizon:

Color—hue of 7.5YR or 10YR, value of 4 to 5, and chroma of 3 to 6

Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

Bw horizon:

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8

Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam; sandy clay loam in some pedons

BC horizon:

Color—horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors

Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

C horizon (if it occurs):

Color—horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors

Texture (fine-earth fraction)—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam saprolite

Cr layer:

Type of bedrock—weathered, weakly to strongly cemented, felsic or mafic high-grade metamorphic or igneous rock

Excavation difficulty—moderate or high

Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:

Type of bedrock—unweathered, hard, felsic or mafic high-grade metamorphic or igneous rock

Excavation difficulty—very high or extremely high

Figure 53.—Typical profile of Pullback sandy loam. Pullback soils are shallow to unweathered hard bedrock and have thick, dark surface layers. They occur in the northwestern part of Buncombe County on high mountains in the Sandymush Bald area.

Pullback Series

Depth class: Shallow
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rocks, such as metasandstone and phyllite
Landscape: High mountains at Sandymush Bald in the northwestern part of the county
Landform: South- to west-facing mountain slopes
Landform position: Side slopes
Slope range: 50 to 95 percent
Taxonomic classification: Loamy, isotic, frigid Humic Lithic Dystrudepts

Typical Pedon

Pullback sandy loam in an area of Breakneck-Pullback complex, 15 to 30 percent slopes, very rocky (fig. 53); Swain County, North Carolina (Great Smoky Mountains National Park); from Bryson City, 10.1 miles east on U.S. Highway 19 along the Tuckasegee River to the town of Cherokee, 19.5 miles northwest on U.S. Highway 441 to Newfound Gap on the Tennessee-North Carolina State line, 7.4 miles southwest on the Clingmans Dome Road to a parking area at the road's end, about 150 feet north of the parking area; Clingmans Dome USGS topographic quadrangle; lat. 35 degrees 33 minutes 24.1 seconds N. and long. 83 degrees 29 minutes 44.1 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.

A—1 to 8 inches; very dark brown (10YR 2/2) clay loam; moderate fine and medium granular structure; very friable; common very fine and fine and many medium to very coarse roots; 5 percent, by volume, metasandstone channers; extremely acid; abrupt wavy boundary.

Bw—8 to 16 inches; dark yellowish brown (10YR 4/4) loam; weak medium and coarse subangular blocky structure; friable; common fine roots; 5 percent, by volume, rock fragments (mainly metasandstone gravel); very strongly acid; clear smooth boundary.

R—16 inches; fractured Thunderhead metasandstone with widely spaced fractures greater than 4 inches apart; very strongly cemented; very high excavation difficulty.

Range in Characteristics

Solum thickness: 14 to 19 inches
Depth to bedrock: 15 to 20 inches to hard bedrock
Content of mica flakes: None or few
Content and size of rock fragments: Less than 35 percent, by volume, throughout the profile; dominantly channers
Soil reaction: Extremely acid to strongly acid

A horizon:
Color—hue of 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—clay loam or loam
Thickness—8 to 18 inches

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8
Texture (fine-earth fraction)—loam or sandy loam

BC horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8
Texture (fine-earth fraction)—loam or sandy loam

C horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8
Texture (fine-earth fraction)—loam or sandy loam

Cr layer (if it occurs):
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasandstone rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, metasandstone rock
Excavation difficulty—very high with very strongly cemented hardness

Reddies Series

Depth class: Very deep
Drainage class: Moderately well drained
Depth to seasonal high water table: 2.0 to 3.5 feet from December through May and 2.5 to 4.0 feet from June through November
Permeability: Moderately rapid in the A and B horizons and rapid or very rapid in the C horizon

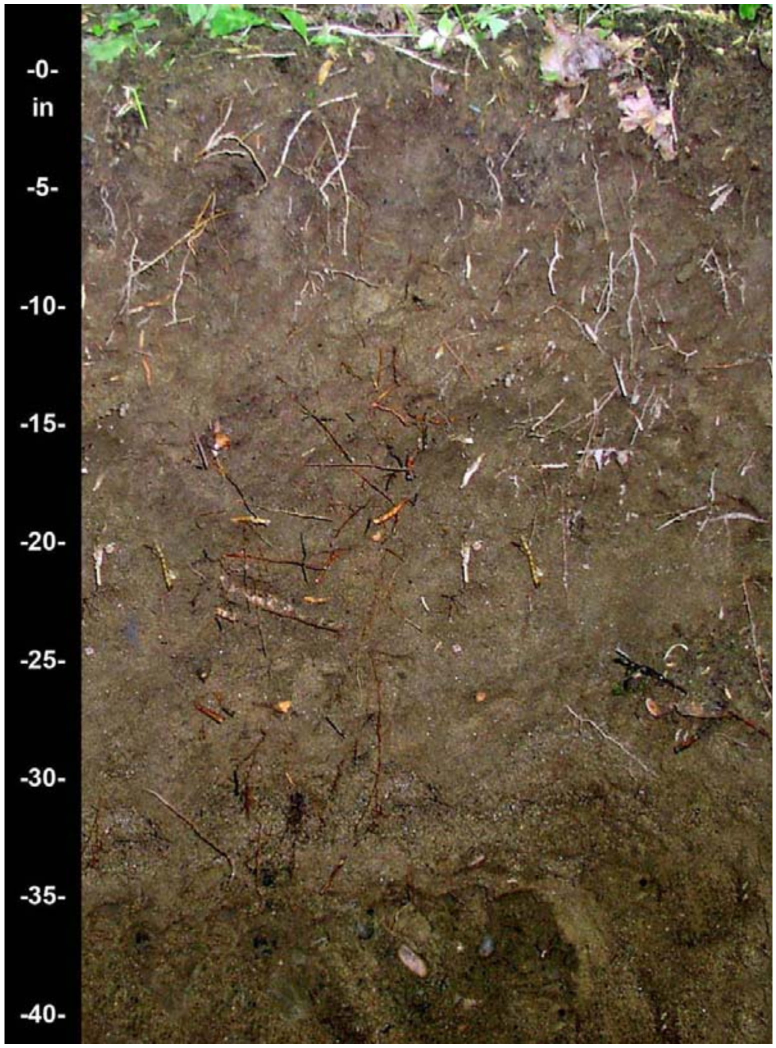

Figure 54.—Typical profile of Reddies sandy loam. Reddies soils are very deep and formed from material deposited by streams and consisting mainly of sand. They occur in mountain valleys of low and intermediate mountains, predominantly at the upper end of large flood plains throughout Buncombe County.

Parent material: Recent alluvium that is coarse-loamy in the upper part and sandy or sandy-skeletal in the lower part, derived from materials weathered from felsic or mafic, high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of low and intermediate mountains throughout the county
Landform: Flood plains dominantly at the upper end of mountain valleys
Landform position: Planar to slightly convex bottomland slopes
Slope range: 0 to 3 percent
Taxonomic classification: Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Oxyaquic Dystrudepts

Typical Pedon

Reddies sandy loam in an area of Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded (fig. 54); Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25, about 1.0 mile west on Interstate 240, about 12.6

miles north on Interstate 26 to Exit #15 (Barnardsville exit), 6.1 miles east-northeast on North Carolina Highway 197 to Barnardsville, 3.6 miles southeast on Secondary Road 2173 along Dillingham Creek to Dillingham Community, 1.3 miles east-northeast on Secondary Road 2173 to U.S. Forest Service boundary, 0.16 mile northwest on U.S. Forest Service road along Corner Rock Creek to just past the second bridge, 120 feet northwest along a trail on the forested flood plain; Barnardsville USGS topographic quadrangle; lat. 35 degrees 45 minutes 23.4 seconds N. and long. 82 degrees 23 minutes 00.4 second W.; NAD27:

Oe—0 to 1 inch; moderately decomposed deciduous and conifer leaves and twigs.

A1—1 to 4 inches; very dark grayish brown (10YR 3/2) sandy loam, dark brown (10YR 3/3) dry; weak fine granular structure; very friable; many very fine, fine, and medium roots throughout, few coarse and very coarse roots; many very fine and fine tubular pores; few fine flakes of mica; 3 percent, by volume, gravel; strongly acid; clear smooth boundary.

A2—4 to 13 inches; dark brown (10YR 3/3) sandy loam, dark yellowish brown (10YR 4/4) dry; weak medium granular structure; very friable; many very fine, fine, and medium roots throughout, few coarse and very coarse roots; many very fine and fine tubular pores; few fine flakes of mica; 5 percent, by volume, gravel; very strongly acid; clear wavy boundary.

Bw—13 to 27 inches; dark yellowish brown (10YR 4/4) loam; few medium faint brown (10YR 4/3) mottles; weak medium subangular blocky structure; friable; common very fine and fine and few coarse roots throughout; common very fine and fine tubular pores; common fine flakes of mica; 5 percent, by volume, gravel and 2 percent cobbles; strongly acid; gradual wavy boundary.

C1—27 to 39 inches; dark yellowish brown (10YR 3/6) very gravelly sandy loam; massive; very friable; few very fine and medium roots at top of horizon; few very fine and medium tubular pores; many fine distinct black (7.5YR 2.5/1) manganese stains on gravel and ped faces; many fine and common medium flakes of mica; 25 percent, by volume, gravel and 15 percent cobbles; moderately acid; clear wavy boundary.

C2—39 to 81 inches; variegated very cobbly loamy coarse sand in shades of yellow, brown, and gray; single grain; loose; few very fine and medium roots at top of horizon; few very fine and medium tubular pores; many fine distinct black (7.5YR 2.5/1) manganese stains on gravel and ped faces; few fine flakes of mica; 15 percent, by volume, gravel, 25 percent cobbles, and 5 percent stones; moderately acid.

Range in Characteristics

Solum thickness: 20 to 39 inches

Depth to contrasting material: 20 to 40 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material

Depth to bedrock: More than 60 inches

Content of mica flakes: Few or common

Content and size of rock fragments: Less than 35 percent, by volume, in the A and B horizons and more than 35 percent in the C horizon; dominantly gravel or cobbles but including stones

Soil reaction: Very strongly acid to neutral throughout the profile

A or Ap horizon:

Color—hue of 7.5YR or 10YR and value and chroma of 2 or 3

Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

Thickness of the A horizon—10 to 20 inches

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8; in some pedons, mottles with chroma of 2 or less are below a depth of 20 inches
Texture (fine-earth fraction)—fine sandy loam or sandy loam

C horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 2 to 6, and chroma of 2 to 8 and may be mixed or mottled in shades of these colors
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loamy coarse sand, sand, or loamy sand alluvium

Rosman Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: 3.5 to more than 6.0 feet from January through December
Permeability: Moderately rapid
Parent material: Recent alluvium that is coarse-loamy in the upper part and sandy material in the lower part and is derived from materials weathered from felsic or mafic, high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountains valleys of intermountain hills; low and intermediate mountains, dominantly along Cane, Hominy, Reems, and Newfound Creeks and the French Broad and Swannanoa Rivers
Landform: Flood plains
Landform position: Planar to slightly convex bottomland slopes
Slope range: 0 to 3 percent
Taxonomic classification: Coarse-loamy, mixed, superactive, mesic Fluventic Humic Dystrudepts

Typical Pedon

Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded; Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25, about 5.1 miles east on Interstate 240, about 12.2 miles east on Interstate 40 to Black Mountain and take Exit #64, about 13.7 miles south on North Carolina Highway 9, about 400 feet west of the highway in a pasture; Black Mountain USGS topographic quadrangle; lat. 35 degrees 30 minutes 36 seconds N. and long. 82 degrees 16 minutes 41 seconds W.; NAD27:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam, brown (10YR 4/3) dry; weak medium granular structure; very friable; many very fine and fine and common medium roots; many very fine and common medium tubular pores; common fine flakes of mica; moderately acid; clear smooth boundary.
A—9 to 12 inches; dark brown (10YR 3/3) fine sandy loam, brown (10YR 5/3) dry; weak medium granular structure; very friable; common very fine and fine and few medium roots; many very fine and common medium tubular pores; common fine flakes of mica; moderately acid; clear smooth boundary.
Bw1—12 to 32 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine subangular blocky structure; very friable; few very fine and fine roots; common medium tubular pores; common very fine and fine flakes of mica; slightly acid; gradual wavy boundary.
Bw2—32 to 47 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; very friable; common very fine and fine roots;

common medium tubular pores; many fine flakes of mica; slightly acid; gradual wavy boundary.

Bw3—47 to 58 inches; yellowish brown (10YR 5/4) fine sandy loam; few medium distinct dark brown (10YR 4/3) mottles in the lower portion; massive; very friable; few very fine and fine roots; common medium tubular pores; common fine flakes of mica; slightly acid; clear wavy boundary.

C1—58 to 71 inches; 65 percent dark yellowish brown (10YR 5/4) and 35 percent dark grayish brown (10YR 4/2) loamy sand; massive; very friable; few very fine roots; few fine tubular pores; common fine flakes of mica; moderately acid; clear wavy boundary.

C2—71 to 80 inches; dark yellowish brown (10YR 5/4) sand; single grain; loose; few very fine roots; common fine tubular pores; many fine flakes of mica; slightly acid.

Range in Characteristics

Solum thickness: 35 to more than 60 inches
Depth to contrasting material: 40 to 60 inches or more to sand and more than 60 inches to deposits of gravel and cobbles that are stratified with sandy or loamy material
Depth to bedrock: More than 60 inches
Content of mica flakes: Few to many
Content and size of rock fragments: Less than 15 percent, by volume, to a depth of 40 inches and less than 50 percent below a depth of 40 inches; dominantly gravel
Soil reaction: Strongly acid to neutral throughout the profile

Ap or A horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam
Thickness—10 to 20 inches

Bw horizon:
Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive below a depth of 24 inches
Texture (fine-earth fraction)—fine sandy loam, sandy loam, very fine sandy loam, or loam

C horizon:
Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 8
Redoximorphic features (if they occur)—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loamy sand, sand, coarse sand, fine sand, coarse sandy loam, sandy loam, fine sandy loam, or loam alluvium; in some pedons, strata containing 15 to 50 percent gravel and cobbles are below a depth of 40 inches

Soco Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock, such as metasandstone

Landscape: Low and intermediate mountains, dominantly from south of Arden to Ridgecrest in the south-central and southeastern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Soco fine sandy loam in an area of Soco-Stecoah complex, 30 to 50 percent slopes, stony; Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 2.1 miles west on U.S. Highway 25 & 70 to Tanyard Gap, 1.4 miles south on U.S. Forest Service Road #113, about 0.15 mile south on U.S. Forest Service Road #3515, about 15 feet above the road on a forested side slope; Hot Springs USGS topographic quadrangle; lat. 35 degrees 54 minutes 03 seconds N. and long. 82 degrees 47 minutes 35 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.
A—1 to 3 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark yellowish brown (10YR 4/4) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; many very fine and fine and common medium and coarse tubular pores; few very fine flakes of mica; 8 percent, by volume, channers and 2 percent flagstones; extremely acid; clear smooth boundary.
BA—3 to 6 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; friable; common very fine, fine, and medium and few coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 5 percent, by volume, channers and 5 percent flagstones; very strongly acid; gradual wavy boundary.
Bw1—6 to 17 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak medium subangular blocky structure; friable; common very fine, fine, and medium and few coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 5 percent, by volume, channers and 5 percent flagstones; very strongly acid; gradual wavy boundary.
Bw2—17 to 26 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine subangular blocky structure; friable; few fine, medium, and coarse roots; common very fine to coarse tubular pores; few very fine flakes of mica; 15 percent, by volume, channers and 5 percent flagstones; strongly acid; gradual wavy boundary.
BC—26 to 34 inches; light yellowish brown (10YR 6/4) fine sandy loam; common medium distinct yellowish brown (10YR 5/6) and few medium pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; very friable; few medium and coarse roots; few very fine to medium tubular pores; few very fine flakes of mica; 15 percent, by volume, channers and 5 percent flagstones; very strongly acid; gradual wavy boundary.
Cr—34 to 80 inches; weathered, strongly cemented metasandstone; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 15 to 39 inches
Depth to bedrock: 20 to 40 inches to weathered bedrock
Content of mica flakes: None to common throughout the profile
Content and size of rock fragments: 5 to less than 35 percent, by volume; dominantly gravel or cobbles
Soil reaction: Extremely acid to strongly acid throughout the profile

A or Ap horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 to 5, and chroma of 1 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—fine sandy loam or loam

BA or AB horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—fine sandy loam, sandy loam, very fine sandy loam, or loam

Bw horizon:
Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—fine sandy loam, sandy loam, very fine sandy loam, or loam

BC horizon:
Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—fine sandy loam, sandy loam, very fine sandy loam, or loam

C horizon (if it occurs):
Color—horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Statler Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: 4.0 to 6.0 feet from January through December
Permeability: Moderate
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of low mountains, dominantly in the central and southern parts of the county
Landform: Low stream terraces
Landform position: Concave to planar toeslopes
Slope range: 1 to 5 percent
Taxonomic classification: Fine-loamy, mixed, active, mesic Humic Hapludults

Typical Pedon

Statler loam, 1 to 5 percent slopes, rarely flooded; Buncombe County, North Carolina; from Asheville, 5.2 miles east on Interstate 240, about 11.3 miles east on Interstate 40 to Exit #64 (Black Mountain exit), 0.5 mile south on North Carolina Highway 9, about 0.4 mile west on Secondary Road #2500, about 0.25 mile north on a private street (Blue Ridge Road), about 600 feet east of a gated farm road and 50 feet south in a cultivated field; Black Mountain USGS topographic quadrangle; lat. 35 degrees 36 minutes 22.4 seconds N. and long. 82 degrees 19 minutes 33.5 seconds W.; NAD27:

Ap1—0 to 8 inches; dark brown (10YR 3/3) loam, dark yellowish brown (10YR 4/4) dry; weak moderate granular structure; very friable; many fine and medium roots; common very fine and fine pores; 4 percent, by volume, rounded quartz gravel; few fine flakes of mica; slightly acid; clear smooth boundary.

Ap2—8 to 12 inches; dark yellowish brown (10YR 4/4) silt loam, yellowish brown (10YR 5/4) dry; weak fine granular structure; very friable; many fine and medium roots; common very fine and fine pores; 4 percent, by volume, rounded quartz gravel; few fine flakes of mica; slightly acid; clear wavy boundary.

BA—12 to 16 inches; dark yellowish brown (10YR 4/6) clay loam; weak medium subangular blocky structure; friable; few very fine and fine roots; common fine and medium pores; few faint discontinuous yellowish brown (10YR 5/4) clay films on faces of peds; 5 percent, by volume, rounded quartz gravel; common fine flakes of mica; slightly acid; gradual wavy boundary.

Bt1—16 to 28 inches; strong brown (7.5YR 5/6) sandy clay loam; few fine prominent yellowish red (5YR 5/6) and common medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few very fine and fine roots; few fine and medium pores; few faint discontinuous dark yellowish brown (10YR 4/4) clay films on faces of peds; 5 percent, by volume, rounded quartz gravel; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt2—28 to 45 inches; strong brown (7.5YR 4/6) sandy clay loam; few fine prominent yellowish red (5YR 5/6) and common medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few very fine and fine roots; few fine and medium pores; few faint discontinuous dark yellowish brown (10YR 4/4) clay films on faces of peds; 5 percent, by volume, rounded quartz gravel; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt3—45 to 63 inches; dark yellowish brown (10YR 4/6) clay loam; weak medium subangular blocky structure; friable; few very fine and fine roots; common fine and medium pores; few faint discontinuous yellowish brown (10YR 5/4) clay films on faces of peds; 5 percent, by volume, rounded quartz gravel; common fine flakes of mica; strongly acid; gradual wavy boundary.

BC—63 to 77 inches; dark yellowish brown (10YR 4/6) loam; few fine prominent yellowish red (5YR 5/8), common medium distinct yellowish brown (10YR 5/6), and few fine distinct brown (10YR 5/3) mottles; weak medium subangular blocky structure; friable; common fine and medium pores; 5 percent, by volume, rounded quartz gravel; common fine flakes of mica; strongly acid; gradual wavy boundary.

C—77 to 83 inches; dark yellowish brown (10YR 4/6) gravelly clay loam; common medium distinct dark grayish brown (10YR 4/2) and few medium distinct light brownish gray (10YR 6/2) mottles; massive; very friable; 20 percent, by volume, rounded quartz gravel and cobbles; common fine flakes of mica; strongly acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches

Depth to bedrock: More than 60 inches

Content of mica flakes: None to common

Content and size of rock fragments: Less than 15 percent, by volume, in the A or Ap horizon and Bt horizon and less than 35 percent in the C horizon

Soil reaction: Strongly acid or moderately acid throughout the profile, except where surface layers have been limed

Ap horizon:

Color—hue of 10YR or 7.5YR, value of 2 to 3, and chroma of 2 to 4

Texture (fine-earth fraction)—loam or fine sandy loam

Thickness of the A horizon—7 to 10 inches

BA horizon:
Color—hue of 10YR to 5YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

Bt horizon:
Color—hue of 10YR to 5YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

BC horizon:
Color—hue of 10YR to 5YR, value of 4 to 6, and chroma of 3 to 8
Redoximorphic features (if they occur)—iron or clay depletions in shades of brown, yellow, or gray and iron accumulations in shades of red, brown, or yellow
Texture (fine-earth fraction)—loam or fine sandy loam

C horizon:
Color—hue of 10YR to 5YR, value of 4 to 6, and chroma of 3 to 8
Redoximorphic features (if they occur)—iron or clay depletions in shades of brown, yellow, or gray and iron accumulations in shades of red, brown, or yellow
Texture (fine-earth fraction)—clay loam, silty clay loam, loam, sandy clay loam, or silt loam alluvium; thin subhorizons of sandy loam are in some pedons

Stecoah Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock, such as metasandstone
Landscape: Low and intermediate mountains, dominantly from south of Arden to Ridgecrest in the south-central and southeastern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Stecoah fine sandy loam in an area of Soco-Stecoah complex, 50 to 95 percent slopes, stony; Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 2.1 miles west on U.S. Highway 25 & 70 to Tanyard Gap, 1.4 miles south on U.S. Forest Service Road #113, about 0.15 mile south on U.S. Forest Service Road #3515, about 15 feet above the road on a forested side slope; Hot Springs USGS topographic quadrangle; lat. 35 degrees 53 minutes 59 seconds N. and long. 82 degrees 47 minutes 32 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.
A—1 to 3 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark yellowish brown (10YR 4/4) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; many very fine to medium and common coarse tubular pores; 5 percent, by volume, channers and 2 percent flagstones; very strongly acid; clear smooth boundary.
BA—3 to 6 inches; brown (10YR 5/3) fine sandy loam; weak medium granular

structure; friable; common very fine to medium and few coarse roots; common very fine to medium and few coarse tubular pores; 5 percent, by volume, channers; strongly acid; gradual wavy boundary.

Bw1—6 to 24 inches; light yellowish brown (10YR 6/4) sandy loam; weak fine subangular blocky structure; friable; common very fine to medium and few coarse roots; common very fine to medium tubular pores; few fine flakes of mica; 5 percent, by volume, channers; very strongly acid; gradual wavy boundary.

Bw2—24 to 34 inches; light yellowish brown (10YR 6/4) sandy loam; few medium distinct strong brown (7.5YR 4/6), common fine faint light gray (10YR 7/2), and common fine faint brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; friable; few very fine to medium and few coarse roots; common very fine to medium tubular pores; few very fine flakes of mica; 5 percent, by volume, channers; very strongly acid; gradual wavy boundary.

BC—34 to 48 inches; yellowish brown (10YR 5/8) sandy loam; few medium distinct strong brown (7.5YR 4/6), common fine faint light gray (10YR 7/2), and common fine faint brownish yellow (10YR 6/8) mottles; weak coarse subangular blocky structure; friable; few very fine to coarse roots; few very fine to coarse tubular pores; few very fine flakes of mica; 10 percent, by volume, channers; very strongly acid; gradual irregular boundary.

Cr—48 to 80 inches; weathered, strongly cemented metasandstone interbedded with phyllite; high excavation difficulty; few seams of variegated channery fine sandy loam in shades of brown, yellow, or red in cracks; few fine and medium roots in cracks that are spaced more than 4 inches apart.

Range in Characteristics

Solum thickness: 24 to 50 inches
Depth to bedrock: 40 to 60 inches to weathered bedrock
Content of mica flakes: None to common throughout the profile
Content and size of rock fragments: Less than 35 percent, by volume; dominantly channers
Soil reaction: Extremely acid to strongly acid throughout the profile

A horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 to 5, and chroma of 1 to 6; where value is 3 or less, the horizon is less than 7 inches thick
Texture (fine-earth fraction)—fine sandy loam or loam

BA or E horizon (if it occurs):
Color—hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

Bw horizon:
Color—hue of 5YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam

BC horizon:
Color—horizon has hue of 5YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8 or is mixed or mottled in shades of these colors; colors with chroma of 2 or less are inherited from the parent material and are not caused by wetness
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam; some pedons have pockets of loamy sand or sandy loam saprolite

C horizon (if it occurs):
Color—horizon has hue of 5YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8 or is mixed or mottled in shades of these colors; colors with chroma of 2 or less are inherited from the parent material and are not caused by wetness

Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, loamy fine sand, or loamy sand saprolite

Cr layer:

Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock

Excavation difficulty—moderate or high

Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Swannanoa Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Depth to seasonal high water table: 1.0 to 2.0 feet from December through May and 2.0 to 3.5 feet from June through November
Permeability: Moderately slow
Parent material: Old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of intermountain hills and low mountains, dominantly in the central and southern parts of the county
Landform: High stream terraces
Landform position: Benches
Slope range: 2 to 15 percent
Taxonomic classification: Fine, mixed, semiactive, mesic Typic Umbraquults

Typical Pedon

Swannanoa silty clay loam in an area of Kanuga-Swannanoa complex, 2 to 8 percent slopes (fig. 55); Henderson County, North Carolina; from Hendersonville, 2.25 miles east on U.S. Highway 64 (Chimney Rock Road) to Interstate 26, about 5.8 miles west on Interstate 26 to Exit #44, about 0.6 mile north on U.S. Highway 25, about 0.7 mile west on Secondary Road 1345 (Butler Bridge Road), 0.25 mile north on a private farm road (Tap Root Lane) to the second farm road to the left, 875 feet west on the farm road through a field, about 250 feet north of the farm road and about 660 feet north-northeast of the Tap Root Dairy main complex, in a cultivated field; Skyland USGS topographic quadrangle; lat. 35 degrees 24 minutes 39.1 seconds N. and long. 82 degrees 31 minutes 47.5 seconds W.; NAD27:

Ap—0 to 15 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark yellowish brown (10YR 4/4) dry; weak fine subangular blocky structure; friable; slightly sticky, slightly plastic; common very fine and fine and few medium roots; common very fine, fine, and medium tubular pores; common medium distinct brown (10YR 4/3) irregularly shaped masses of iron concentrations in the matrix of the lower part of the horizon; few medium distinct black (10YR 2/1) irregularly shaped masses of manganese concentrations in the matrix; less than 5 percent aerial coverage of very fine and fine flakes of mica; 2 percent, by volume, rounded quartz gravel; slightly alkaline; clear smooth boundary.

Btg1—15 to 31 inches; dark grayish brown (10YR 4/2) clay; moderate medium subangular blocky structure; firm; moderately sticky, moderately plastic; common very fine and fine roots; common fine and medium tubular pores; few or common discontinuous distinct yellowish brown (10YR 5/4) clay films on faces of peds; common medium faint grayish brown (10YR 5/2) cylindrical iron depletions and common medium distinct yellowish brown (10YR 5/6) iron concentrations in linings of root channels; few or common irregularly shaped iron depletions and accumulations with clear boundaries throughout; few fine to medium distinct black

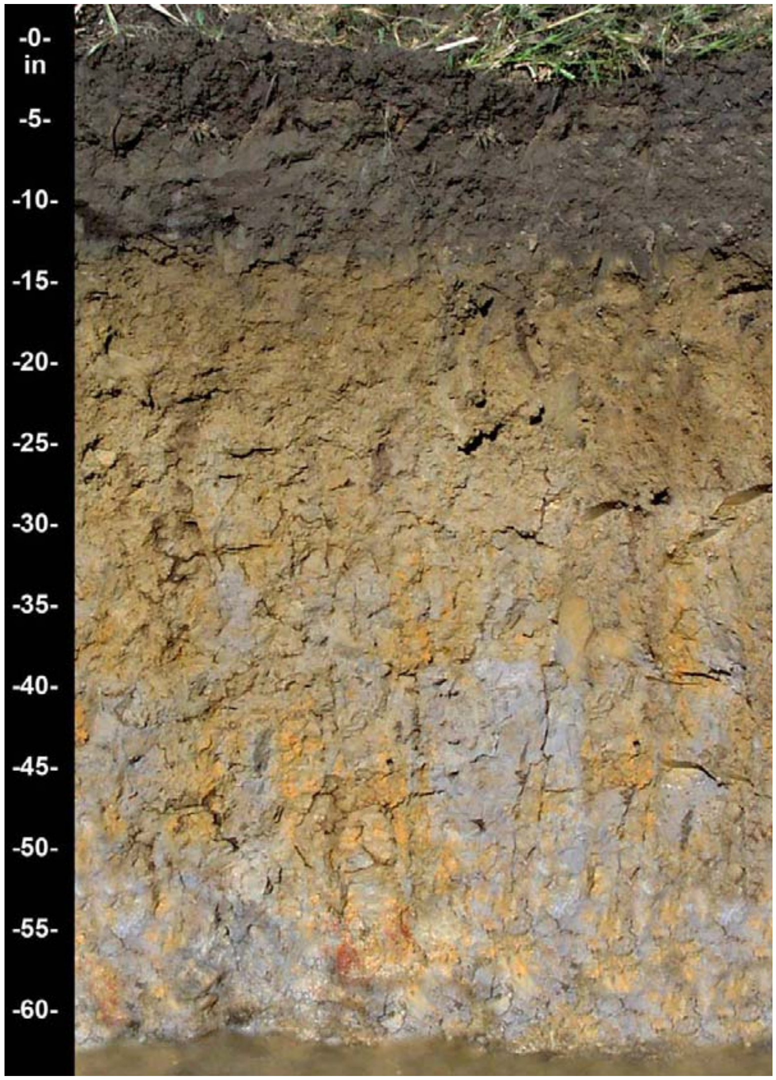

Figure 55.—Typical profile of Swannanoa silty clay loam. Swannanoa soils are very deep, have thick, dark surface layers, and formed from old alluvial deposits on high stream terraces. They occur in mountain valleys of intermountain hills and low mountains predominantly along large flood plains throughout the central and southern parts of Buncombe County.

(10YR 2/1) irregularly shaped masses of manganese concentrations between peds; less than 5 percent aerial coverage of very fine and fine flakes of mica; 2 percent, by volume, rounded quartz gravel; slightly acid; gradual wavy boundary.

Btg2—31 to 44 inches; grayish brown (10YR 5/2) clay loam; moderate medium subangular blocky structure; firm; moderately sticky, moderately plastic; few very fine and fine roots; few fine and coarse tubular pores; common continuous faint light yellowish brown (10YR 6/4) clay films on faces of peds; many medium to coarse prominent strong brown (7.5YR 5/6) and few or common fine to faint brown (10YR 4/3) irregularly shaped masses of iron concentrations in the matrix; less than 5 percent aerial coverage of very fine and fine flakes of mica; 5 percent, by volume, rounded quartz gravel; very strongly acid; clear wavy boundary.

Btg3—44 to 64 inches; gray (10YR 6/1) clay; moderate coarse subangular blocky

structure; firm; moderately sticky, moderately plastic; few very fine and fine roots between faces of peds; few fine and medium tubular pores; common continuous faint light gray (10YR 7/2) clay films on faces of peds; common medium distinct brown (10YR 5/3) and few fine prominent strong brown (7.5YR 5/8) irregularly shaped masses of iron concentrations and common medium faint brown (7.5YR 5/2) irregularly shaped masses of iron depletions in the matrix; few fine distinct very dark gray (10YR 3/1) organic waxy coatings and black (10YR 2/1) irregularly shaped masses of manganese concentrations between peds; less than 5 percent aerial coverage of very fine and fine flakes of mica; 5 percent, by volume, rounded quartz gravel and cobbles; very strongly acid; clear wavy boundary.

Cg—64 to 91 inches; gray (2.5Y 6/1) gravelly sandy clay; massive; very firm; very sticky, very plastic; few fine prominent strong brown (7.5YR 5/8) irregularly shaped masses of iron concentrations and common medium distinct light brownish gray (10YR 6/2) irregularly shaped masses of iron depletions in the matrix; less than 5 percent aerial coverage of fine flakes of mica; 20 percent, by volume, rounded gravel and 5 percent cobbles; extremely acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: None to many
Content and size of rock fragments: Less than 15 percent, by volume, in the A horizon to the upper part of the Bt horizon, less than 35 percent in the lower part of the Bt horizon and in the Btg and BCg horizons, and less than 60 percent in the Cg horizon; dominantly gravel and cobbles
Soil reaction: Extremely acid to moderately acid throughout the profile

A or Ap horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—silty clay loam, clay loam, sandy clay loam, silt loam, fine sandy loam, sandy loam, or loam

BA horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6
Redoximorphic features—iron or clay accumulations in shades of red, brown, yellow, black, or olive
Texture (fine-earth fraction)—sandy clay loam, clay loam, or silty clay loam

Btg horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 1 or 2
Redoximorphic features—iron or clay accumulations in shades of red, brown, yellow, black, or olive
Texture (fine-earth fraction)—clay, silty clay, clay loam, or silty clay loam

2Btg horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 1 or 2
Redoximorphic features—iron or clay accumulations in shades of red, brown, yellow, black, or olive
Texture (fine-earth fraction)—clay, silty clay, clay loam, or silty clay loam

BCg horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 0 to 2 or neutral in hue and value of 1 or 2; in some pedons, horizon has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1 or 2
Redoximorphic features—iron or clay accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—sandy clay loam, loam, silty clay loam, or clay loam

2BCg horizon (if it occurs):

Color—hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 0 to 2 or neutral in hue and value of 1 or 2; in some pedons, horizon has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1 or 2

Redoximorphic features—iron or clay accumulations in shades of red, brown, yellow, or olive

Texture (fine-earth fraction)—sandy clay loam, loam, silty clay loam, or clay loam

Cg horizon:

Color—hue of 7.5YR to 5Y, value of 2 to 8, and chroma of 0 or 2 or neutral in hue and value of 1 or 2; in some pedons, horizon has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1 or 2

Redoximorphic features—iron or clay accumulations in shades of red, brown, yellow, or olive

Texture (fine-earth fraction)—loam, silt loam, clay loam, silty clay loam, silty clay, or clay

2Cg horizon (if it occurs):

Color—hue of 7.5YR to 5Y, value of 2 to 8, and chroma of 0 to 2 or neutral in hue and value of 1 or 2; in some pedons, horizon has hue of 5GY, 5G, 5BG, or 5B, value of 4 to 7, and chroma of 1 or 2

Redoximorphic features—iron or clay accumulations in shades of red, brown, yellow, or olive

Texture (fine-earth fraction)—loam, silt loam, clay loam, silty clay loam, silty clay, or clay

Sylco Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from low-grade metasedimentary rock, such slate, phyllite, and thinly bedded metasandstone
Landscape: Low and intermediate mountains in the south-central and southeastern parts of the county
Landform: Ridges and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 15 to 95 percent
Taxonomic classification: Loamy-skeletal, mixed, active, mesic Typic Dystrudepts

Typical Pedon

Sylco channery loam in an area of Sylco-Soco complex, 50 to 95 percent slopes, very stony (fig. 56); Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 10.5 miles north on U.S. Highway 25 & 70 to Hurricane, 1.1 miles west on U.S. Highway 25 & 70 to old U.S. Highway 25 & 70, about 0.5 mile west to U.S. Forest Service Road #476 (Rich Mountain road), 4.1 miles northwest to Hurricane Gap on the Tennessee-North Carolina State line, 0.15 mile south on U.S. Forest Service Road #476-A to a logging road, 0.3 mile southeast to a logging road, 0.15 mile northeast, 10 feet above the road in a west-facing cut slope; USGS Hot Springs topographic quadrangle; lat. 35 degrees 56 minutes 05 seconds N. and long. 82 degrees 48 minutes 06 seconds W.; NAD27:

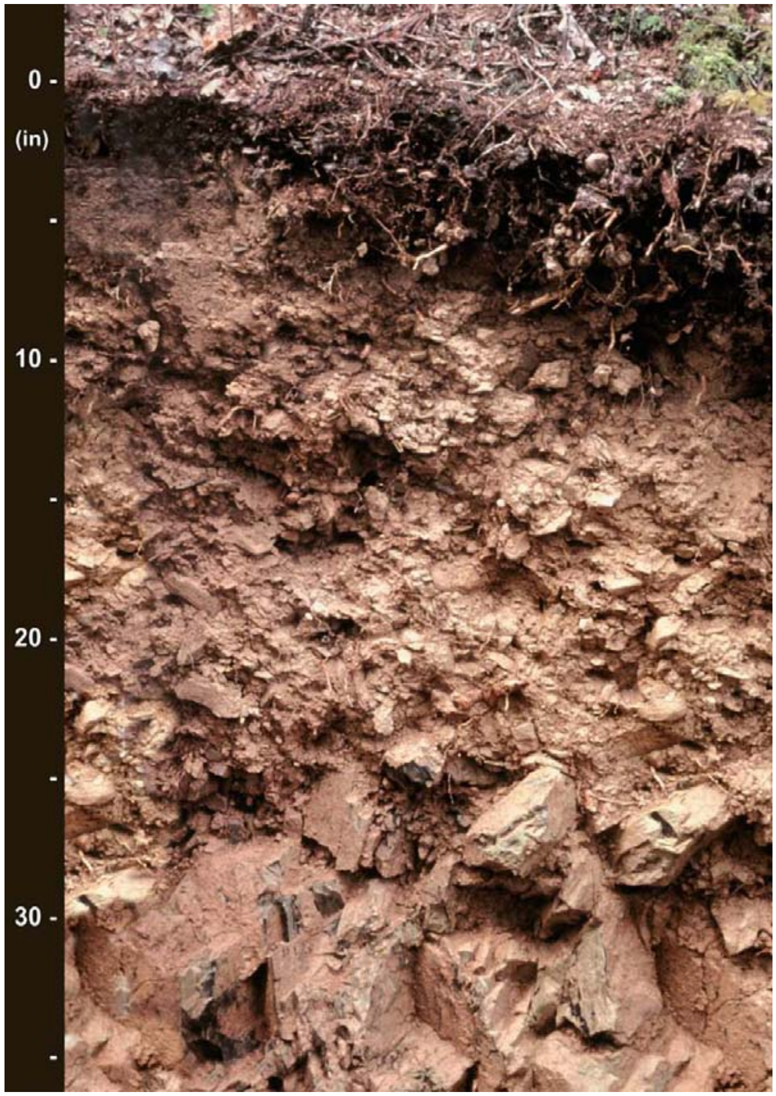

Figure 56.—Typical profile of Sylco channery loam. Sylco soils are moderately deep to unweathered, fractured, thin-layered bedrock. They occur on low or intermediate mountains predominantly in the south-central and southeastern parts of Buncombe County.

Oe—0 to 2 inches; moderately decomposed organic litter and root mat.

A1—2 to 4 inches; dark yellowish brown (10YR 3/4) channery loam, dark yellowish brown (10YR 4/6) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; common very fine and fine tubular pores; 15 percent, by volume, channers and 5 percent flagstones; very strongly acid; clear smooth boundary.

A2—4 to 7 inches; dark yellowish brown (10YR 4/4) very channery loam, yellowish brown (10YR 5/4) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; common very fine and fine tubular pores; 20 percent, by volume, channers and 5 percent flagstones; very strongly acid; clear smooth boundary.

Bw1—7 to 15 inches; brown (7.5YR 5/4) very channery loam; weak fine subangular blocky structure; friable; common very fine, fine, and medium roots; common very

fine and fine tubular pores; 30 percent, by volume, channers and 15 percent flagstones; very strongly acid; gradual wavy boundary.

Bw2—15 to 25 inches; strong brown (7.5YR 5/6) very channery loam; weak fine subangular blocky structure; friable; common very fine, fine, and medium roots; common very fine and fine tubular pores; 20 percent, by volume, channers and 25 percent flagstones; very strongly acid; gradual irregular boundary.

Cr—25 to 33 inches; weathered, strongly cemented interbedded slate and phyllite; high excavation difficulty; few fine and medium pores in few thin seams of dark yellowish brown (10YR 4/6) loam in cracks; strongly acid; few roots in cracks that are spaced more than 4 inches apart; gradual irregular boundary.

R—33 to 80 inches; unweathered, hard interbedded slate and phyllite bedrock.

Range in Characteristics

Solum thickness: 17 to 39 inches
Depth to bedrock: 20 to 40 inches
Content of mica flakes: None
Content and size of rock fragments: 10 to 50 percent, by volume, in the A horizon, 15 to 45 percent in the B horizon, and 40 to 70 percent or more in the C horizon; average content of these fragments between a depth of 10 inches and bedrock ranges from 35 to 50 percent; dominantly channers and flagstones
Soil reaction: Extremely acid to strongly acid throughout the profile

A1 horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 2 to 4; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam or silt loam

A2 horizon:
Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam or silt loam

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, silt loam, or silty clay loam

C horizon (if it occurs):
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, silt loam, or silty clay loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, low-grade metasedimentary rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, low-grade metasedimentary rock
Excavation difficulty—very high or extremely high

Tanasee Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid

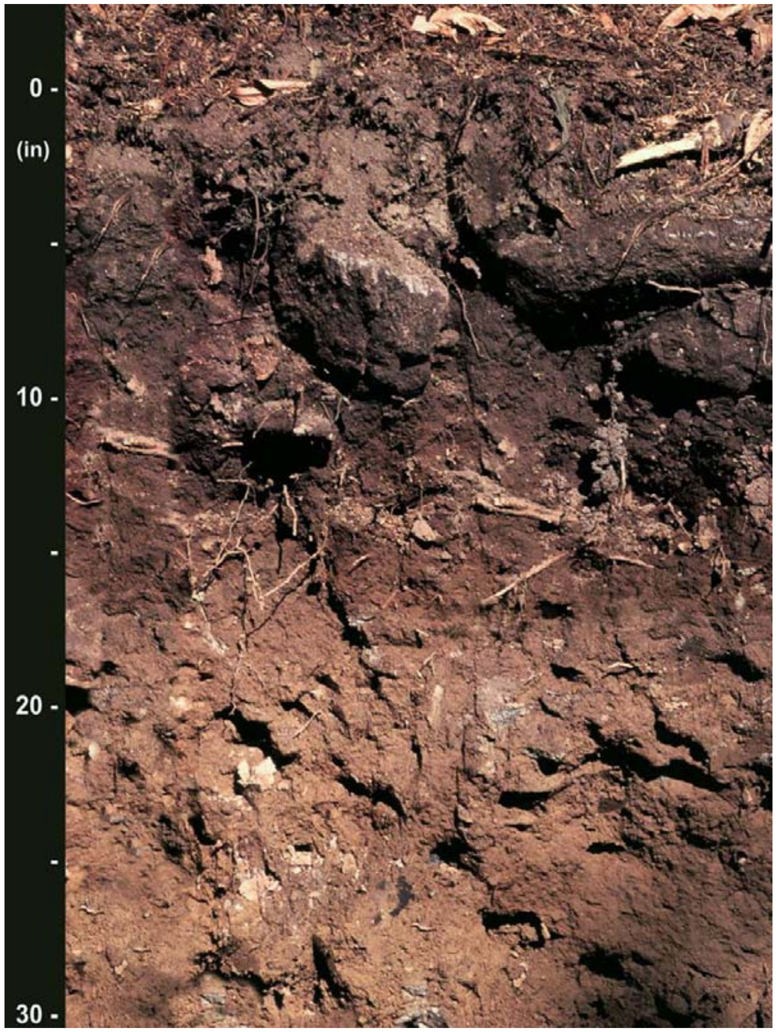

Figure 57.—Typical profile of Tanasee loam. Tanasee soils are very deep, have thick, dark surface layers, and formed from local colluvium. They occur on high mountains in coves and drainageways in the northeastern and southwestern parts of Buncombe County in the Pisgah and Craggy Mountain Ranges.

Parent material: Colluvium derived from materials weathered from high-grade metamorphic rock on the Pisgah and Craggy Mountains
Landscape: High mountains in the Mt. Pisgah, Craggy Garden, and Potato Knob parts of the county
Landform: Coves, drainageways, and colluvial fans
Landform position: Head slopes, footslopes, and toeslopes
Slope range: 15 to 50 percent
Taxonomic classification: Fine-loamy, isotic, frigid Humic Dystrudepts

Typical Pedon

Tanasee loam in an area of Balsam-Tanasee complex, 15 to 30 percent slopes, extremely bouldery (fig. 57); Buncombe County, North Carolina; from Asheville, 5.1 miles east on Interstate 240 to the junction of Interstates 240 and 40, about 0.2 mile south on U.S. Highway 74 to the Blue Ridge Parkway entrance, 25.5 miles north on the Blue Ridge Parkway to the Balsam Gap parking area on the Yancey County line,

700 feet south-southeast of the parking area (across the Blue Ridge Parkway) in a forested cove; Montreat USGS topographic quadrangle; lat. 35 degrees 44 minutes 49 seconds N. and long. 82 degrees 20 minutes 03 seconds W.; NAD27:

Oi—0 to 1 inch; slightly decomposed organic litter and root mat.

A1—1 to 9 inches; very dark brown (10YR 2/2) loam, dark brown (10YR 3/3) dry; weak fine granular structure; very friable; many very fine and fine, common medium, and few coarse roots; many very fine, common fine and medium, and few coarse tubular pores; few very fine and fine flakes of mica; 4 percent, by volume, gravel; very strongly acid; clear wavy boundary.

A2—9 to 15 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 4/3) dry; weak medium granular structure; very friable; common very fine and fine and few medium and coarse roots; many very fine, common fine and medium, and few coarse tubular pores; few very fine and fine flakes of mica; 4 percent, by volume, gravel; very strongly acid; gradual wavy boundary.

Bw1—15 to 29 inches; dark yellowish brown (10YR 4/6) cobbly fine sandy loam; weak medium subangular blocky structure; friable; few very fine to medium roots; common very fine and few fine and medium tubular pores; few very fine and fine flakes of mica; 4 percent, by volume, gravel and 12 percent cobbles; very strongly acid; gradual wavy boundary.

Bw2—29 to 42 inches; yellowish brown (10YR 5/8) cobbly sandy loam; weak medium subangular blocky structure; friable; few very fine and fine roots; few very fine to medium tubular pores; few very fine and fine flakes of mica; 5 percent, by volume, gravel and 15 percent cobbles; strongly acid; gradual wavy boundary.

BC—42 to 56 inches; yellowish brown (10YR 5/4) cobbly sandy loam; weak coarse subangular blocky structure; very friable; few very fine and fine roots; few very fine and fine tubular pores; few fine flakes of mica; 10 percent, by volume, gravel and 10 percent cobbles; strongly acid; gradual wavy boundary.

C1—56 to 75 inches; dark yellowish brown (10YR 4/6) gravelly loamy coarse sand; massive; very friable; few fine and medium roots; 15 percent, by volume, cobbles, 10 percent gravel, and 5 percent stones; common fine and medium flakes of mica; very strongly acid; gradual wavy boundary.

C2—75 to 83 inches; variegated gravelly loamy sand saprolite in shades of brown, yellow, and gray; massive; very friable; 16 percent, by volume, rock fragments which are mainly gravel with a few cobbles; common fine and medium flakes of mica; very strongly acid.

Range in Characteristics

Solum thickness: 24 to more than 57 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common
Content and size of rock fragments: Less than 35 percent, by volume, to a depth of 40 inches and less than 60 percent below a depth of 40 inches; ranging from gravel to stones
Soil reaction: Extremely acid to strongly acid throughout the profile

A horizon:
Color—hue of 7.5YR to 2.5YR, value of 2 or 3, and chroma of 1 to 3 or hue of 7.5YR, value of 2 or 3, and chroma of 0 or 2
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, or sandy clay loam
Thickness—10 to 20 inches

AB horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 3

Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, or sandy clay loam

BA horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—fine sandy loam, sandy loam, loam, or sandy clay loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—fine sandy loam, sandy loam, loam, or sandy clay loam

BC horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—fine sandy loam, sandy loam, loam, or sandy clay loam

C horizon (if it occurs):
Color—variegated in shades of brown, yellow, red, or olive
Texture (fine-earth fraction)—loam, fine sandy loam, sandy loam, coarse sandy loam, loamy sand, loamy fine sand, or loamy coarse sand saprolite

Tate Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid in the surface layer, moderate in the subsoil, and moderately rapid in the underlying material
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock, such as hornblende gneiss and biotite gneiss
Landscape: Intermountain hills and low mountains throughout the county
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Slope range: 2 to 30 percent
Taxonomic classification: Fine-loamy, mixed, semiactive, mesic Typic Hapludults

Typical Pedon

Tate loam, 8 to 15 percent slopes; Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25, about 1.0 mile west on Interstate 240, about 12.6 miles north on Interstate 26 to Exit #15 (Barnardsville exit), 7.0 miles northeast on North Carolina Highway 197 and 0.9 mile northeast of Barnardsville, about 20 feet north of the road in a cultivated field; Barnardsville USGS topographic quadrangle; lat. 35 degrees 46 minutes 57.4 seconds N. and long. 82 degrees 26 minutes 26.2 seconds W.; NAD27:

Ap—0 to 6 inches; brown (10YR 4/3) loam, dark yellowish brown (10YR 5/4) dry; weak medium subangular blocky structure; very friable; many very fine and fine roots; many very fine and medium tubular pores; common fine flakes of mica; 4 percent, by volume, gravel; strongly acid; abrupt smooth boundary.
Bt1—6 to 22 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common very fine and many fine roots; many fine and medium tubular pores; discontinuous faint dark yellowish brown (10YR 4/4) clay films on faces of peds and surfaces of rock fragments; common fine

flakes of mica; 3 percent, by volume, gravel; moderately acid; gradual wavy boundary.

Bt2—22 to 35 inches; strong brown (7.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; common very fine and fine roots; common fine and medium tubular pores; discontinuous faint brown (7.5YR 4/4) clay films on faces of peds; common fine flakes of mica; 3 percent, by volume, gravel; moderately acid; gradual wavy boundary.

Bt3—35 to 42 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; common very fine and fine roots; common very fine and fine tubular pores; discontinuous faint strong brown (7.5YR 4/6) clay films on faces of peds; discontinuous faint clay bridges between sand grains; common fine and medium flakes of mica; 3 percent, by volume, gravel; moderately acid; gradual wavy boundary.

Bt4—42 to 49 inches; dark yellowish brown (10YR 4/6) sandy clay loam; moderate medium angular blocky structure; friable; common very fine and fine roots; common fine and medium tubular pores; patchy faint strong brown (7.5YR 4/6) clay films on faces of peds; patchy faint clay bridges between sand grains; common fine and medium and few coarse flakes of mica; 6 percent, by volume, gravel and 3 percent cobbles; strongly acid; gradual wavy boundary.

BC—49 to 56 inches; dark yellowish brown (10YR 6/6) sandy loam; weak medium subangular blocky structure; friable; common very fine and fine roots; few fine and medium tubular pores; discontinuous faint clay bridges between sand grains; common fine, medium and coarse flakes of mica; 5 percent, by volume, gravel and 4 percent cobbles; moderately acid; clear wavy boundary.

C—56 to 81 inches; yellowish brown (10YR 5/4) cobbly sandy loam; common medium distinct strong brown (7.5YR 5/6) and few medium prominent yellowish red (5YR 5/6) mottles; massive; friable; common very fine and fine roots; few fine and medium tubular pores; many fine, medium, and coarse flakes of mica; 10 percent, by volume, gravel and 15 percent cobbles; moderately acid.

Range in Characteristics

Solum thickness: 24 to more than 60 inches

Depth to bedrock: More than 60 inches

Content of mica flakes: None to common throughout the profile

Content and size of rock fragments: Less than 35 percent, by volume, in the A and Bt horizons and less than 60 percent in the BC and C horizons; ranging from gravel to stones

Soil reaction: Very strongly acid to slightly acid throughout the profile, except where surface layers have been limed

Ap or A horizon:

Color—hue of 10YR, value of 2 or 3, and chroma of 2 to 4; where value is 3 or less, the A horizon is less than 7 inches thick

Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

Bt horizon:

Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8

Texture (fine-earth fraction)—clay loam, loam, or sandy clay loam

BC horizon:

Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8 and may be mixed or mottled in shades of these colors

Texture (fine-earth fraction)—sandy clay loam, fine sandy loam, loam, clay loam, or sandy loam

C horizon:

Color—horizon has hue of 7.5YR or 2.5Y, value of 4 to 6, and chroma of 4 to 8 and may be mixed or mottled in shades of these colors

Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam colluvium

Toecane Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock, such as granite, hornblende gneiss, and biotite gneiss
Landscape: Low and intermediate mountains, dominantly in the western and eastern parts of the county
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Slope range: 8 to 50 percent
Taxonomic classification: Loamy-skeletal, mixed, active, mesic Humic Hapludults

Typical Pedon

Toecane cobbly loam in an area of Toecane-Tusquitee complex, 30 to 50 percent slopes, very bouldery (fig. 58); Buncombe County, North Carolina; from Asheville, about 1.0 mile west on Interstate 240, about 12.6 miles north on Interstate 26 to Exit #15 (Barnardsville exit), 14.8 miles northeast on North Carolina Highway 197 and about 0.6 mile northwest of Cane River Gap on the Yancey County line, about 15 feet northeast of the road, near an intermittent drainageway in a forested cove; Mt. Mitchell USGS topographic quadrangle; lat. 35 degrees 48 minutes 45.4 seconds N. and long. 82 degrees 21 minutes 26.2 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.

A1—1 to 5 inches; black (10YR 2/1) cobbly loam, very dark grayish brown (10YR 3/2) dry; weak fine granular structure; very friable; many very fine and fine and few medium roots; few fine and medium pores; common very fine flakes of mica; 10 percent, by volume, gravel and 5 percent cobbles; very strongly acid; clear smooth boundary.

A2—5 to 9 inches; very dark grayish brown (10YR 3/2) very cobbly loam, dark brown (10YR 3/3) dry; weak medium granular structure; friable; many very fine and fine roots; few very fine and fine tubular pores; common very fine and fine flakes of mica; 10 percent, by volume, gravel and 15 percent cobbles; very strongly acid; gradual wavy boundary.

Bt1—9 to 13 inches; dark yellowish brown (10YR 3/6) very cobbly loam; weak medium subangular blocky structure; friable; common very fine and fine roots; few fine tubular pores; few very fine and fine flakes of mica; 15 percent, by volume, gravel and 20 percent cobbles; strongly acid; gradual wavy boundary.

Bt2—13 to 24 inches; yellowish brown (10YR 5/4) very cobbly sandy clay loam; weak medium subangular blocky structure; friable; common very fine and fine roots; few very fine and fine flakes of mica; 15 percent, by volume, gravel, 20 percent cobbles, and 5 percent stones; very strongly acid; gradual wavy boundary.

BC—24 to 37 inches; dark yellowish brown (10YR 4/6) very cobbly sandy loam; weak medium subangular blocky structure; very friable; few fine roots; few very fine and fine flakes of mica; 15 percent, by volume, gravel, 20 percent cobbles, and 10 percent stones; strongly acid; gradual wavy boundary.

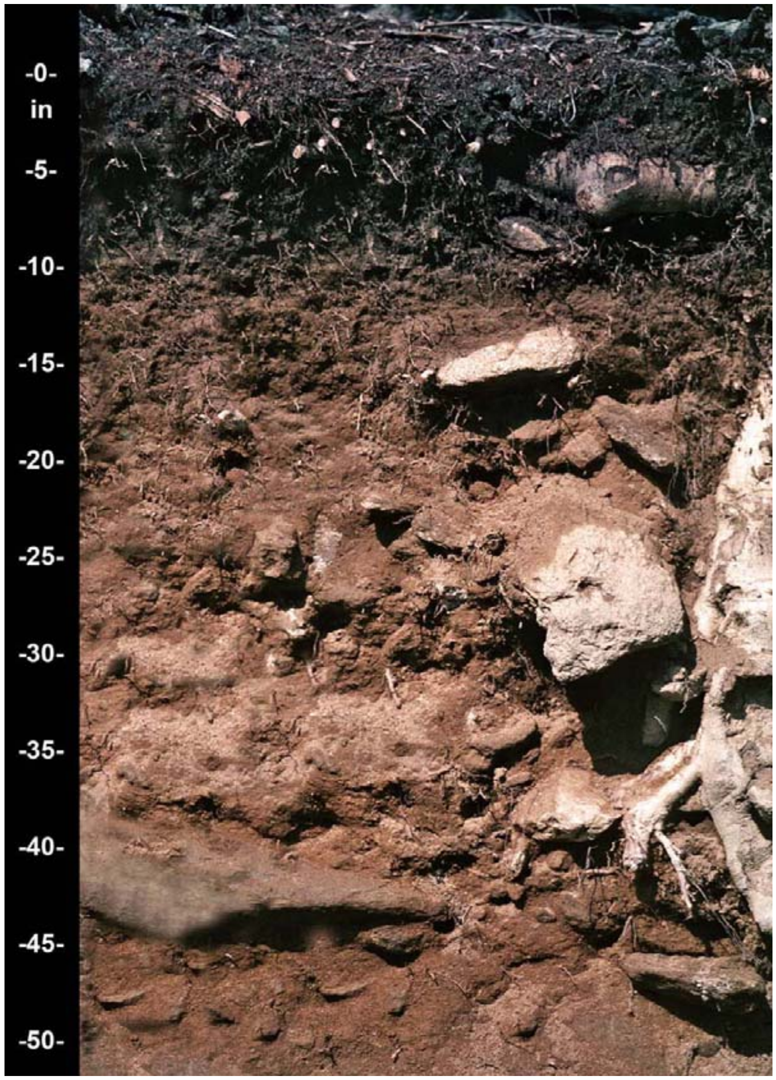

Figure 58.—Typical profile of Toecane cobbly loam. Toecane soils are very deep, have thick, dark surface layers, have many rock fragments in the subsoil, and formed from local colluvium. They occur in coves and drainageways on low or intermediate mountains, predominantly in the eastern and western parts of Buncombe County.

C—37 to 80 inches; dark yellowish brown (10YR 4/4) extremely cobbly loamy sand; massive; few fine roots; few very fine and fine flakes of mica; 15 percent, by volume, gravel, 30 percent cobbles, and 20 percent stones; strongly acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common in the A and B horizons and few to many in the C horizon
Content and size of rock fragments: 15 to 60 percent, by volume, in the A and B horizons and 35 to 80 percent in the C horizon; typically increasing in amount with depth; ranging from gravel to boulders
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or sandy clay loam
Thickness—7 to 10 inches

AE or AB horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—loam, fine sandy loam, sandy loam, or sandy clay loam

Bt horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loam, sandy clay loam, sandy loam, or fine sandy loam

BC horizon:
Color—horizon has hue of 7.5YR to 2Y, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam, loamy sand, loamy fine sand, coarse sandy loam, fine sandy loam, or loam

C horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—loamy sand, loamy fine sand, coarse sandy loam, sandy loam, fine sandy loam, or sand; thin layers of loam colluvium occur in some pedons

Toxaway Series

Depth class: Very deep
Drainage class: Very poorly drained
Depth to seasonal high water table: 1.0 foot or less from December through May and 0.5 foot to 1.5 feet from June through November
Permeability: Moderate
Parent material: Recent loamy alluvium that is derived from material weathered from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of intermountain hills; low and intermediate mountains, dominantly along Cane, Hominy, Reems, and Newfound Creeks and the French Broad and Swannanoa Rivers
Landform: Flood plains
Landform position: Planar to slightly concave bottomland slopes
Slope range: 0 to 2 percent
Taxonomic classification: Fine-loamy, mixed, superactive, nonacid, mesic Cumulic Humaquepts

Typical Pedon

Toxaway loam, 0 to 2 percent slopes, frequently flooded; Henderson County, North Carolina; from downtown Hendersonville, 0.6 mile south on U.S. Highway 25 Business (Church Street), 0.1 mile south on U.S. Highway 25 Business (Main Street), 1.4 miles southeast on U.S. Highway 176 (Spartanburg Highway), 0.62 mile northeast on Secondary Road 1779 (Shepherd Street/Airport Road) to a highway curve south of Hendersonville-Winkler Airport, about 400 feet southeast of the road and King Creek

and 600 feet southwest of Bat Creek, on a flood plain in a cultivated field; Hendersonville USGS topographic quadrangle: lat. 35 degrees 18 minutes 15.22 seconds N. and long. 82 degrees 25 minutes 42.73 seconds W.; NAD27:

A1—0 to 26 inches; very dark gray (10YR 3/1) and black (10YR 2/1) loam; moderate medium granular structure; friable; sticky, slightly plastic; common fine roots; few fine flakes of mica; moderately acid; gradual smooth boundary.

A2—26 to 36 inches; very dark gray (10YR 3/1) loam; weak medium granular structure; friable; few fine roots; common fine flakes of mica; moderately acid; clear smooth boundary.

Cg1—36 to 43 inches; very dark gray (10YR 3/1) sandy loam; massive; very friable; slightly sticky; common fine flakes of mica; moderately acid; clear smooth boundary.

Cg2—43 to 53 inches; grayish brown (10YR 5/2) sand; few fine prominent yellowish brown (10YR 5/6) mottles; single grained; loose; common fine flakes of mica; moderately acid; clear smooth boundary.

Cg3—53 to 65 inches; gray (N 6/0) sandy clay loam that has lenses of sandy loam; massive; friable; slightly sticky, slightly plastic; common fine flakes of mica; moderately acid; clear smooth boundary.

Cg4—65 to 82 inches; gray (N 6/0) loamy sand; single grain; loose; common fine flakes of mica; moderately acid.

Range in Characteristics

Depth to contrasting material: 40 to 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few to many
Content and size of rock fragments: Less than 5 percent in the A horizon and less than 15 percent in the Cg horizon; dominantly well rounded gravel or cobbles
Soil reaction: Strongly acid to slightly acid throughout the profile, except where surface layers have been limed

A or Ap horizon:
Color—hue of 10YR or neutral in hue, value of 2 or 3, and chroma of 0 to 3; dry value is less than 5
Organic matter content—moderate or high
Texture (fine-earth fraction)—silt loam or loam
Thickness of A horizon—more than 24 inches

Ab horizon (if it occurs):
Color—hue of 10YR or neutral in hue, value of 2 or 3, and chroma of 0 to 3; dry value is less than 5
Thickness of the organic matter content—moderate or high
Texture (fine-earth fraction)—silt loam or loam

Cg horizon:
Color—hue of 10YR or 2.5Y or neutral in hue, value of 3 to 6, and chroma of 0 to 2
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray
Texture (fine-earth fraction)—clay loam, sandy clay loam, silt loam, loam, silty clay loam, sandy loam, or fine sandy loam alluvium that commonly has lenses and strata of loamy sand or sand; gravel or cobbles are in some pedons

Trimont Series

Depth class: Very deep
Drainage class: Well drained

Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock, such as hornblende gneiss, biotite gneiss, or amphibolite
Landscape: Low and intermediate mountains in the south-central and southeastern parts of the county
Landform: North- to east-facing ridges, mountain slopes, heads of coves, and those slopes shaded by the higher mountains
Landform position: Side slopes
Slope range: 30 to 50 percent
Taxonomic classification: Fine-loamy, mixed, active, mesic Humic Hapludults

Typical Pedon

Trimont loam, 30 to 50 percent slopes, stony; Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25 (Biltmore Avenue), 2.4 miles east on Interstate 240 to Exit #7 (Tunnel Road), 5.3 miles east on U.S. Highway 70, about 0.8 mile north on Secondary Road 2416 (Farm School Road), 0.1 mile northwest on Secondary Road 2575 (College View Road), 0.3 mile east on a gated logging road and about 900 feet south on a forested side slope; Oteen USGS topographic quadrangle; lat. 35 degrees 35 minutes 55.7 seconds N. and long. 82 degrees 27 minutes 02.5 seconds W.; NAD27:

Oi—0 to 1 inch; slightly decomposed leaves, twigs, roots, and other deciduous plant material.
A1—1 to 8 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 4/2) dry; weak fine granular structure; very friable; many fine and medium and common coarse roots; 7 percent, by volume, gravel and 3 percent cobbles; common fine flakes of mica; strongly acid; clear wavy boundary.
A2—8 to 11 inches; dark yellowish brown (10YR 3/4) gravelly loam, brown (10YR 4/4) dry; weak fine granular structure; very friable; common fine and medium and few coarse roots; 12 percent, by volume, gravel and 3 percent cobbles; common fine flakes of mica; strongly acid; clear wavy boundary.
Bt1—11 to 29 inches; reddish brown (5YR 4/3) sandy clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; 10 percent, by volume, gravel; common fine flakes of mica; strongly acid; gradual wavy boundary.
Bt2—29 to 44 inches; yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; 10 percent, by volume, gravel; common fine flakes of mica; moderately acid; gradual wavy boundary.
BC—44 to 62 inches; reddish brown (5YR 4/4) loam; weak medium subangular blocky structure; friable; few fine and medium roots; 10 percent, by volume, gravel; common fine flakes of mica; moderately acid; gradual wavy boundary.
C—62 to 81 inches; brown (7.5YR 5/4) sandy loam; weak medium granular structure; very friable; few fine and medium roots; 10 percent, by volume, gravel and cobbles; common fine flakes of mica; moderately acid.

Range in Characteristics

Solum thickness: 27 to 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common

Content and size of rock fragments: Less than 35 percent, by volume, throughout the profile; dominantly gravel or cobbles
Soil reaction: Very strongly acid to moderately acid throughout the profile

A horizon:
Color—hue of 5YR to 10YR, value of 2 or 3, and chroma of 2 to 4
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

Bt horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—clay loam, sandy clay loam, or loam

BC horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

C horizon:
Color—horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 6 to 8 and may be mixed or mottled in shades of red, brown, or yellow
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam saprolite

Tusquitee Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Colluvium derived from felsic or mafic high-grade metamorphic or igneous rock, such as granite, hornblende gneiss, and biotite gneiss
Landscape: Low and intermediate mountains, dominantly in the western and eastern parts of the county
Landform: Coves, colluvial fans, drainageways, and benches
Landform position: Head slopes, footslopes, and toeslopes
Slope range: 8 to 50 percent
Taxonomic classification: Fine-loamy, isotic, mesic Typic Dystrudepts

Typical Pedon

Tusquitee gravelly loam in an area of Toecane-Tusquitee complex, 15 to 30 percent slopes, very bouldery (fig. 59); Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25 (Biltmore Avenue), about 1.0 mile west on Interstate 240, about 12.6 miles north on Interstate 26 to Exit #15 (Barnardsville exit), 14.7 miles northeast on North Carolina Highway 197, about 50 feet southwest on U.S. Forest Service Road 5553, north above the road on a forested slope; also 0.7 mile northwest of Cane River Gap at the Yancey County line; Mt. Mitchell USGS topographic quadrangle; lat. 35 degrees 48 minutes 43.4 seconds N. and long. 82 degrees 21 minutes 31.8 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.
A1—1 to 5 inches; black (10YR 2/1) gravelly loam, very dark grayish brown (10YR 3/2) dry; moderate medium granular structure; very friable; many very fine and fine, common medium, and few coarse roots; many very fine and fine tubular pores; few fine flakes of mica; 12 percent, by volume, gravel, and 5 percent cobbles; very strongly acid; clear wavy boundary.
A2—5 to 9 inches; very dark grayish brown (10YR 3/2) gravelly loam, brown (10YR 5/3) dry; moderate medium granular structure; very friable; many very fine and fine and common medium and coarse roots; few very fine and fine tubular pores; few

Figure 59.—Typical profile of Tusquitee gravelly loam. Tusquitee soils are very deep, have thick, dark surface layers, and formed from local colluvium. They occur in coves and drainageways on low or intermediate mountains predominantly in the eastern and western parts of Buncombe County.

fine flakes of mica; 12 percent, by volume, gravel and 5 percent cobbles; very strongly acid; clear smooth boundary.

Bw1—9 to 22 inches; brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; common very fine, fine, and medium and few coarse roots; common very fine and fine tubular pores; few fine flakes of mica; 5 percent, by volume, gravel and 5 percent cobbles; strongly acid; gradual wavy boundary.

Bw2—22 to 31 inches; dark yellowish brown (10YR 4/6) gravelly sandy loam; weak medium subangular blocky structure; friable; common very fine and fine and few medium and coarse roots; common very fine and fine tubular pores; few fine flakes of mica; 12 percent, by volume, gravel and 6 percent cobbles; strongly acid; gradual wavy boundary.

Bw3—31 to 42 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few very fine and common fine roots; few very

fine and common fine tubular pores; few fine and medium flakes of mica; 4 percent, by volume, gravel and 6 percent cobbles; strongly acid; diffuse wavy boundary.

Bw4—42 to 71 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; very friable; few very fine and fine roots; few very fine and fine tubular pores; few fine and medium flakes of mica; 10 percent, by volume, gravel and 3 percent cobbles; strongly acid; gradual wavy boundary.

Bw5—71 to 86 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; few very fine roots; few very fine tubular pores; common fine flakes of mica; 10 percent, by volume, gravel and 3 percent cobbles; strongly acid; gradual wavy boundary.

BC—86 to 101 inches; dark yellowish brown (10YR 4/6) cobbly sandy loam; weak coarse subangular blocky structure; very friable; few fine and medium roots; few very fine and fine tubular pores; few fine and medium flakes of mica; 10 percent, by volume, gravel and 15 percent cobbles; strongly acid.

Range in Characteristics

Solum thickness: 40 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common in the A and B horizons and few to many in the C horizon
Content and size of rock fragments: Less than 35 percent, by volume, to a depth of 40 inches and less than 60 percent below a depth of 40 inches; ranging from gravel to stones
Soil reaction: Very strongly acid to slightly acid in the A horizon and very strongly acid to moderately acid in the Bw and lower horizons

A or Ap horizon:
Color—hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 4
Texture (fine-earth fraction)—loam, fine sandy loam, sandy loam, or sandy clay loam
Thickness of the A horizon—7 to 10 inches

Bw horizon:
Color—hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or sandy clay loam

BC horizon:
Color—hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, or sandy clay loam

C horizon (if it occurs):
Color—hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—loamy coarse sand, loamy sand, loamy fine sand, coarse sandy loam, sandy loam, fine sandy loam, or loam colluvium

Udifluvents

Depth class: Very deep
Drainage class: Excessively drained
Depth to seasonal high water table: 3.5 to 5 feet from January through December
Permeability: Very rapid
Parent material: Recent alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock

Landscape: Mountain valleys, dominantly along the French Broad River
Landform: Flood plains, including river islands
Landform position: Planar to slightly convex slopes
Slope range: 0 to 5 percent
Taxonomic classification: Udifluvents

Typical Pedon

Udifluvents in this survey area consist of very low-lying, riverwash areas that are subject to scouring and deposition during flooding. Areas include small islands and the inside river bends dominantly along the French Broad and Swannanoa Rivers and Hominy, Cane, and Reems Creeks. A typical pedon is not given due to the variable nature of the soil.

Range in Characteristics

Depth to contrasting material: 40 to more than 60 inches to deposits of cobbles and gravel that are stratified with sandy or loamy material
Thickness of underlying soil material: More than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few to many
Content and size of rock fragments: 0 to 15 percent, by volume, to a depth of 40 inches and variable below a depth of 40 inches; typically increasing in amount with depth; dominantly gravel or cobbles but including stones and boulders
Soil reaction: Extremely acid to moderately acid throughout the profile

C horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 3 to 7, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Redoximorphic features (if they occur)—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—coarse sand, sand, loamy coarse sand, loamy sand, or sandy loam alluvium

Udorthents

Depth class: Deep and very deep
Drainage class: Somewhat excessively drained to moderately well drained
Depth to seasonal high water table: Variable, occasionally 3 to 6 feet; more commonly more than 6 feet from January through December
Permeability: Very rapid to slow
Parent material: Fill areas—mixture of earthy material and natural soils; excavated areas—variable, depending on the type of underlying bedrock
Landscape: Intermountain hills and low and intermediate mountains
Landform: Summits, side slopes, coves, terraces, footslopes, toeslopes, and flood plains where natural soil has been excavated or covered by earthy fill material
Slope range: 0 to 50 percent
Taxonomic classification: Udorthents

Typical Pedon

Udorthents in this survey area consist of cut and fill areas where soil and the underlying material has been removed and placed on an adjacent site. Areas include highway right-of-way corridors and building sites. Other areas include landfills; borrow pits; recreational areas, such as ball fields; and depressions filled with construction

debris and covered with soil material. A typical pedon is not given due to the variable nature of the soil.

Range in Characteristics

Depth to bedrock: Excavated areas—bedrock commonly exposed at or near the soil surface; fill areas—40 to more than 60 inches
Content and size of rock fragments: Variable, commonly 15 to 50 percent; ranging from gravel to stones
Soil reaction: Extremely acid to moderately acid throughout the profile

Fill areas:
Color—hue of 2.5YR to 5Y, value of 4 to 8, and chroma of 2 to 8
Texture (fine-earth fraction)—variable, commonly loamy

Excavated areas:
Color—hue of 2.5YR to 5Y, value of 4 to 8, and chroma of 2 to 8
Texture (fine-earth fraction)—variable, commonly loamy

Unaka Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock, such as granite and biotite gneiss
Landscape: Low and intermediate mountains in the western and eastern parts of the county
Landform: Ridges, north- to east-facing mountain slopes, and those slopes shaded by the higher mountains
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, mesic Typic Dystrudepts

Typical Pedon

Unaka loam in an area of Porters-Unaka loam, 50 to 95 percent slopes, rocky; Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25 (Biltmore Avenue), about 1.0 mile west on Interstate 240, about 12.6 miles north on Interstate 26 to Exit #15 (Barnardsville exit), 15.4 miles northeast on North Carolina Highway 197 to Cane River Gap on the Yancey County line, 0.35 mile south on a gated U.S. Forest Service road, 10 feet above the road on a forested side slope; Mt. Mitchell USGS topographic quadrangle; lat. 35 degrees 48 minutes 24.1 seconds N. and long. 82 degrees 20 minutes 58.6 seconds W.; NAD27:

Oe—0 to 1 inch; moderately decomposed organic litter and root mat.
A1—1 to 5 inches; very dark brown (10YR 2/2) loam, brown (10YR 4/3) dry; weak fine granular structure; very friable; many very fine, common fine and medium, and few coarse roots; common very fine and fine tubular pores; few very fine flakes of mica; 5 percent, by volume, gravel and 7 percent cobbles; very strongly acid; clear smooth boundary.
A2—5 to 9 inches; dark brown (10YR 3/3) loam, dark yellowish brown (10YR 4/4) dry; weak medium granular structure; very friable; many very fine, common fine and medium, and few coarse roots; common very fine and fine tubular pores; few very

fine flakes of mica; 5 percent, by volume, gravel and 7 percent cobbles; strongly acid; clear smooth boundary.

Bw1—9 to 14 inches; dark yellowish brown (10YR 4/6) loam; moderate medium subangular blocky structure; friable; common very fine and fine and few medium and coarse roots; few fine tubular pores; few very fine and fine flakes of mica; 8 percent, by volume, gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.

Bw2—14 to 23 inches; yellowish brown (10YR 5/4) cobbly loam; weak medium subangular blocky structure; friable; common very fine and fine and few medium roots; few fine tubular pores; few very fine flakes of mica; 8 percent, by volume, gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.

BC—23 to 27 inches; yellowish brown (10YR 5/4) gravelly sandy loam; weak medium subangular blocky structure; friable; few very fine, fine, and medium roots; few fine tubular pores; few very fine flakes of mica; 5 percent, by volume, gravel and 15 percent cobbles; very strongly acid; gradual wavy boundary.

Cr—27 to 32 inches; weathered, strongly cemented biotite gneiss; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; gradual wavy boundary.

R—32 to 80 inches; unweathered biotite gneiss bedrock.

Range in Characteristics

Solum thickness: 18 to 36 inches
Depth to bedrock: 20 to 40 inches to hard bedrock
Content of mica flakes: Few or common
Content and size of rock fragments: 5 to 20 percent, by volume, in the A and B horizons and 5 to 35 percent in the C horizon; ranging from gravel to stones
Soil reaction: Very strongly acid or strongly acid throughout the profile

A horizon:
Color—hue of 10YR and value and chroma of 2 or 3
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy clay loam
Thickness—7 to 10 inches

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6
Texture (fine-earth fraction)—loam or sandy loam; sandy clay loam in some pedons

BC horizon:
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6
Texture (fine-earth fraction)—loam or sandy loam

C horizon (if it occurs):
Color—horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, felsic or mafic high-grade metamorphic or igneous rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:

Type of bedrock—unweathered, hard, felsic or mafic high-grade metamorphic or igneous rock; very high or extremely high excavation difficulty

Unison Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderate
Parent material: Old alluvium and colluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of low mountains, dominantly in the central and southern parts of the county
Landform: Coves and high stream terraces
Landform position: Footslopes, toeslopes, and benches
Slope range: 2 to 30 percent
Taxonomic classification: Fine, mixed, semiactive, mesic Typic Hapludults

Typical Pedon

Unison loam, 2 to 8 percent slopes; Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25 (Biltmore Avenue), about 1.0 mile west on Interstate 240, about 1.7 miles west on U.S. Highway 19/23, about 10.9 miles northwest on North Carolina Highway 63, about 1.2 miles west on Secondary Road 1389, about 75 feet south in a cultivated field; Sandymush USGS topographic quadrangle; lat. 35 degrees 40 minutes 34.9 seconds N. and long. 82 degrees 45 minutes 10.8 seconds W.; NAD27:

Ap1—0 to 6 inches; dark yellowish brown (10YR 4/4) loam, light yellowish brown (10YR 6/4) dry; moderate fine granular structure; very friable; many very fine and fine and common medium roots; many medium tubular pores; few very fine flakes of mica; 2 percent, by volume, subangular quartz gravel; neutral; gradual smooth boundary.

Ap2—6 to 11 inches; dark yellowish brown (10YR 4/6) loam, brownish yellowish (10YR 6/6) dry; weak fine granular structure; very friable; many very fine and fine and common medium roots; common fine and many medium tubular pores; few very fine flakes of mica; 4 percent, by volume, subangular quartz gravel; neutral; clear smooth boundary.

BA—11 to 15 inches; strong brown (7.5YR 4/6) clay loam; moderate medium granular structure; friable; slightly sticky, slightly plastic; common very fine and fine roots; common fine and medium tubular pores; few discontinuous distinct strong brown (7.5YR 5/6) clay films on faces of peds; few very fine flakes of mica; 4 percent, by volume, subangular quartz gravel; neutral; gradual wavy boundary.

Bt1—15 to 29 inches; strong brown (7.5YR 5/6) clay; moderate medium subangular blocky structure; firm; sticky, plastic; common very fine and fine roots; common fine and medium tubular pores; few discontinuous distinct strong brown (7.5YR 4/6) clay films on faces of peds; few discontinuous distinct brown (10YR 4/3) stains on faces of peds; common very fine flakes of mica; 2 percent, by volume, subangular quartz gravel; moderately acid; clear wavy boundary.

Bt2—29 to 41 inches; strong brown (7.5YR 5/8) clay; moderate medium subangular blocky structure; firm; sticky, plastic; common very fine and fine roots; common fine and few coarse tubular pores; few discontinuous faint strong brown (7.5YR 5/6) clay films on faces of peds; few very fine to medium black (10YR 2/1) iron-manganese stains; few fine flakes of mica; 6 percent, by volume, subangular quartz gravel and cobbles; strongly acid; gradual wavy boundary.

Bt3—41 to 53 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few very fine and few fine roots; common fine and medium tubular pores; few discontinuous distinct strong brown (7.5YR 4/6) clay films on faces of peds; few very fine to medium black (10YR 2/1) iron-manganese stains; many fine and medium flakes of mica; 4 percent, by volume, subangular quartz gravel and cobbles; strongly acid; gradual wavy boundary.

BC—53 to 71 inches; strong brown (7.5YR 5/6) gravelly sandy clay loam; common fine distinct yellowish brown (10YR 5/6) and common medium distinct reddish brown (5YR 4/4) mottles; weak coarse subangular blocky structure; friable; few very fine roots; common fine and few medium tubular pores; few patchy faint strong brown (7.5YR 4/6) clay films on faces of peds; few very fine to medium black (10YR 2/1) iron-manganese stains; few fine and medium flakes of mica; 12 percent, by volume, subangular quartz gravel and 4 percent cobbles; moderately acid; gradual wavy boundary.

C—71 to 83 inches; strong brown (7.5YR 5/6) cobbly sandy clay loam; massive; friable; sticky; few very fine to medium black (10YR 2/1) iron-manganese stains; few fine and medium flakes of mica; 15 percent, by volume, subangular quartz cobbles and 4 percent gravel; moderately acid.

Range in Characteristics

Solum thickness: 30 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few to many
Content and size of rock fragments: Less than 35 percent, by volume, in the Ap, A, BA, or Bt horizon and less than 70 percent in the underlying horizons; dominantly gravel and cobbles
Soil reaction: Very strongly acid to moderately acid throughout the profile, except where surface layers have been limed

Ap horizon:
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—loam or fine sandy loam

BA horizon:
Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6
Texture (fine-earth fraction)—clay loam, silty clay loam, or heavy silt loam

Bt horizon:
Color—hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 to 8
Texture (fine-earth fraction)—clay or clay loam

BC horizon:
Color—hue of 2.5YR to 7.5YR, value of 3 to 8, and chroma of 3 to 6
Texture (fine-earth fraction)—clay loam, loam, or clay

C or 2C horizon (if it occurs):
Color—hue of 2.5YR to 7.5YR, value of 4 to 8, and chroma of 3 to 6
Texture (fine-earth fraction)—loam or clay loam colluvium/alluvium; some pedons have sandy, gravelly, and cobbly substrata

Walnut Series

Depth class: Moderately deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid

Parent material: Residuum affected by soil creep in the upper part, weathered from felsic or mafic high-grade metamorphic or igneous rock, such as migmatitic gneiss
Landscape: Low and intermediate mountains, dominantly in the north-central part of the county
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Coarse-loamy, mixed, superactive, mesic Dystric Eutrudepts

Typical Pedon

Walnut fine sandy loam in an area of Walnut-Oteen-Mars Hill complex, 30 to 50 percent slopes, moderately eroded; Madison County, North Carolina; from Marshall, 4.3 miles south on Secondary Road 1001, about 1.2 miles southwest on Secondary Road 1114, about 0.5 mile northeast on Secondary Road 1116, about 0.3 mile east on Secondary Road 1115, about 0.3 mile northeast on an unmarked farm road to a gate, 250 feet northeast on a west-facing convex slope of 45 percent, in a pasture; USGS Leicester topographic quadrangle; lat. 35 degrees 44 minutes 15 seconds N. and long. 82 degrees 40 minutes 44 seconds W.; NAD27:

Ap1—0 to 2 inches; brown (10YR 4/3) fine sandy loam, yellowish brown (10YR 5/4) dry; moderate fine granular structure; very friable; common very fine roots; few fine and medium interstitial pores; few fine flakes of mica; 5 percent, by volume, migmatitic gneiss gravel; strongly acid; abrupt smooth boundary.
Ap2—2 to 9 inches; dark yellowish brown (10YR 4/4) fine sandy loam; common medium distinct strong brown (7.5YR 4/6) mottles in interior of peds; weak coarse granular structure; very friable; few very fine roots; few fine and medium interstitial and few very fine and fine tubular pores; few fine flakes of mica; 4 percent, by volume, migmatitic gneiss gravel; moderately acid; abrupt smooth boundary.
Bw—9 to 21 inches; strong brown (7.5YR 4/6) loam; weak fine subangular blocky structure; very friable; few very fine roots; few fine and medium interstitial and few very fine and fine tubular pores; common fine flakes of mica; 1 percent, by volume, migmatitic gneiss gravel; slightly acid; gradual wavy boundary.
BC—21 to 27 inches; strong brown (7.5YR 4/6) very gravelly fine sandy loam; weak fine subangular blocky structure; very friable; few very fine roots; few fine and medium interstitial and few very fine and tubular pores; common fine flakes of mica; 28 percent, by volume, migmatitic gneiss gravel; slightly acid; gradual irregular boundary.
Cr—27 to 42 inches; weathered, strongly cemented migmatitic gneiss; high excavation difficulty; few fine and medium roots in cracks that are spaced more than 4 inches apart; gradual wavy boundary.
R—42 to 80 inches; unweathered, hard migmatitic gneiss bedrock.

Range in Characteristics

Solum thickness: 15 to 39 inches
Depth to bedrock: 20 to 40 inches to weathered bedrock
Content of mica flakes: Few or common
Content and size of rock fragments: 0 to 35 percent in the A and B horizons and 0 to 40 percent in the C horizon
Soil reaction: Strongly acid to neutral throughout the profile

A or Ap horizon:
Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6; where value is 3 or less, the A horizon is less than 7 inches thick
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y and value and chroma of 4 to 6
Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

BC horizon:
Color—hue of 7.5YR to 2.5Y and value and chroma of 4 to 6
Texture (fine-earth fraction)—fine sandy loam, sandy loam, or loam

C horizon (if it occurs):
Color—horizon has hue of 7.5YR to 5Y and value and chroma of 4 to 6 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam, fine sandy loam, or loam saprolite

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, mixed felsic and mafic high-grade metamorphic rock, such as migmatitic gneiss, biotite-hornblende gneiss, and amphibolite
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

R layer:
Type of bedrock—unweathered, hard, mixed felsic and mafic high-grade metamorphic rock, such as migmatitic gneiss, biotite-hornblende gneiss, and amphibolite

Wayah Series

Depth class: Very deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Moderately rapid
Parent material: Residuum affected by soil creep in the upper part, weathered from granite
Landscape: High mountains on Mt. Pisgah in the southwestern part of the county and Craggey Gardens to Potato Knob in the northeastern part
Landform: Ridges and mountain slopes
Landform position: Summits and side slopes
Slope range: 8 to 95 percent
Taxonomic classification: Fine-loamy, isotic, frigid Humic Dystrudepts

Typical Pedon

Wayah loam in an area of Wayah-Burton complex, windswept, 30 to 50 percent slopes, bouldery; Buncombe County, North Carolina; from Asheville, 5.2 miles on Interstate 240 East to the Interstate 40 and U.S. Highway 74 interchange, 0.25 mile southeast on U.S. Highway 74, about 20.5 miles northeast on the Blue Ridge Parkway, 0.3 mile north on the Craggy Garden picnic road to Beetree Gap and continue 0.6 mile east-northeast on a paved road to a sharp curve, 50 feet south-southeast of the trail on a forested side slope; Craggy Pinnacle USGS topographic quadrangle; lat. 35 degrees 42 minutes 05 seconds N. and long. 82 degrees 23 minutes 24 seconds W.; NAD27:

Oe—0 to 2 inches; moderately decomposed grass and leaf litter.
A1—2 to 5 inches; black (10YR 2/1) loam, very dark grayish brown (10Y 3/2) dry; moderate medium granular structure; very friable; many very fine, fine, medium, and coarse roots throughout; many very fine and fine tubular and interstitial pores;

few very fine and fine flakes of mica; 3 percent, by volume, gravel and cobbles; extremely acid; abrupt smooth boundary.

A2—5 to 8 inches; very dark brown (10YR 2/2) loam, brown (10YR 4/3) dry; weak fine and medium granular structure; very friable; common very fine, fine, and medium and few coarse roots throughout; common very fine and fine tubular and interstitial pores; few very fine and fine flakes of mica; 3 percent, by volume, gravel and cobbles; very strongly acid; abrupt smooth boundary.

A3—8 to 14 inches; very dark grayish brown (10YR 3/2) fine sandy loam, brown (10YR 5/3) dry; weak fine and medium granular structure; very friable; common very fine and fine and few medium and coarse roots between peds; common very fine and fine tubular and interstitial pores; few very fine and fine flakes of mica; 3 percent, by volume, gravel and cobbles; very strongly acid; clear wavy boundary.

Bw1—14 to 24 inches; dark yellowish brown (10YR 3/6) sandy loam; weak medium subangular blocky structure; friable; few fine to coarse roots between peds; common very fine and fine tubular and interstitial pores; few very fine and fine flakes of mica; 6 percent, by volume, gravel and cobbles; strongly acid; gradual wavy boundary.

Bw2—24 to 42 inches; yellowish brown (10YR 5/8) gravelly sandy loam; weak medium to coarse subangular blocky structure; friable; few fine and medium roots between peds; common very fine and fine tubular pores; few very fine and fine flakes of mica; 17 percent, by volume, gravel and cobbles; strongly acid; gradual wavy boundary.

BC—42 to 53 inches; dark yellowish brown (10YR 4/6) gravelly coarse sandy loam; weak coarse subangular blocky structure; very friable; few very fine roots; few fine tubular pores; few very fine and fine flakes of mica; 25 percent, by volume, gravel and cobbles; strongly acid; gradual wavy boundary.

C1—53 to 72 inches; dark yellowish brown (10YR 4/6) cobbly coarse sandy loam saprolite; common fine faint brown (10YR 5/3) and few medium faint pale brown (10YR 6/3) mottles; massive; very friable; few very fine tubular pores; few very fine and fine flakes of mica; 15 percent, by volume, gravel and 15 percent cobbles; moderately acid; gradual irregular boundary.

C2—72 to 81 inches; variegated cobbly coarse sandy loam saprolite in shades of red, brown, yellow, and white; massive; friable; few fine flakes of mica; 10 percent, by volume, gravel, 15 percent cobbles, and 5 percent stones; strongly acid.

Range in Characteristics

Solum thickness: 20 to more than 60 inches
Depth to bedrock: More than 60 inches
Content of mica flakes: Few or common above a depth of 40 inches and few to many below a depth of 40 inches
Content and size of rock fragments: Less than 35 percent, by volume; ranging from gravel to stones
Soil reaction: Extremely acid to moderately acid throughout the profile

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, sandy clay loam, or clay loam
Thickness—10 to 20 inches

BA horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 or 4; some pedons have mottles in shades of brown
Texture (fine-earth fraction)—loam, sandy loam, fine sandy loam, or sandy clay loam

Bw horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8; some pedons have mottles in shades of brown
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, or sandy clay loam

BC horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, coarse sandy loam, fine sandy loam, or loam

C horizon:
Color—horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Texture (fine-earth fraction)—sandy loam, loamy sand, loamy fine sand, fine sandy loam, or loam saprolite

Cr layer (if it occurs):
Type of bedrock—weathered, weakly to strongly cemented metagraywacke
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Whiteside Series

Depth class: Very deep
Drainage class: Moderately well drained
Depth to seasonal high water table: 2.0 to 3.0 feet from December through May and 2.0 to 3.5 feet from June through November
Permeability: Moderate
Parent material: Colluvium and old alluvium derived from felsic or mafic high-grade metamorphic, igneous, or low-grade metasedimentary rock
Landscape: Mountain valleys of the intermountain hills and low mountains throughout the county
Landform: Coves, colluvial fans, and benches
Landform position: Concave to planar toeslopes
Slope range: 2 to 15 percent
Taxonomic classification: Fine-loamy, mixed, active, mesic Aquic Hapludults

Typical Pedon

Whiteside loam in an area of Tusquitee-Whiteside complex, 2 to 8 percent slopes; Madison County, North Carolina; from Marshall, 1.9 miles north on U.S. Highway 25 & 70 Business, 16.5 miles northeast on U.S. Highway 25 & 70 to Hot Springs, 11.3 miles south on North Carolina Highway 209, about 0.5 mile northeast on a farm road and 200 feet north in a hayfield; Spring Creek USGS topographic quadrangle; lat. 35 degrees 47 minutes 56.1 seconds N. and long. 82 degrees 52 minutes 7.7 seconds W.; NAD27:

Ap—0 to 11 inches; dark brown (10YR 3/3) loam, dark yellowish brown (10YR 4/4) dry; weak medium granular structure; very friable; common fine and medium roots throughout; common fine and medium tubular pores; 8 percent, by volume, subangular gravel; common fine flakes of mica; slightly acid; abrupt smooth boundary.
Bt1—11 to 23 inches; yellowish brown (10YR 5/6) sandy clay loam that has common streaks of very dark grayish brown (10YR 3/2) in old root channels; weak medium

subangular blocky structure; very friable; few fine roots between peds; few fine tubular pores; common fine flakes of mica; slightly acid; clear wavy boundary.

Bt2—23 to 31 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium distinct mottles; weak medium subangular blocky structure; friable; few fine roots between peds; few fine tubular pores; many medium prominent strong brown (7.5YR 4/6) and grayish brown (10YR 5/2) irregularly shaped masses of iron accumulation with clear boundaries in the matrix; few faint clay films on faces of peds; common fine flakes of mica; moderately acid; clear wavy boundary.

BCg—31 to 45 inches; gray (10YR 6/1) sandy loam; weak medium subangular blocky structure; friable; few fine roots between peds; few fine tubular pores; common medium faint gray (10YR 5/1) irregularly shaped iron depletions with clear boundaries and common medium distinct yellowish brown (10YR 5/8) irregularly shaped iron depletions along root channels with clear boundaries throughout; common fine to coarse flakes of mica; moderately acid; gradual wavy boundary.

Cg1—45 to 55 inches; light brownish gray (10YR 6/2) sandy loam; common medium distinct brownish yellow (10YR 6/6) mottles; massive; very friable; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Cg2—55 to 80 inches; gray (10YR 6/1) sandy clay loam; common medium distinct yellowish brown (10YR 4/6) mottles; massive; firm; common thin lenses and pockets of grayish brown (10YR 5/2) loamy sand; few fine flakes of mica; strongly acid.

Range in Characteristics

Solum thickness: 30 to 60 inches

Depth to bedrock: More than 60 inches

Content of mica flakes: Few to many

Content and size of rock fragments: Less than 15 percent, by volume; some pedons, below a depth of 40 inches, have 15 to less than 60 percent; ranging from gravel to stones

Soil reaction: Very strongly acid to moderately acid, except where surface layers have been limed

A or Ap horizon:

Color—hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 to 3

Texture (fine-earth fraction)—loam, sandy loam, or fine sandy loam

Thickness of A horizon—10 to 20 inches

Bt horizon:

Color—hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8; chroma of 2 or less occurs within 24 inches of the upper part of the Bt horizon

Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive

Texture (fine-earth fraction)—sandy clay loam, loam, fine sandy loam, or sandy loam

BC horizon (if it occurs):

Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 8

Texture (fine-earth fraction)—loam, fine sandy loam, or sandy loam

BCg horizon:

Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2

Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive

Texture (fine-earth fraction)—fine sandy loam, loam, or sandy loam

C horizon (if it occurs):

Color—hue of 10YR to 5Y, value of 4 to 7, and chroma of 3 to 8

Mottles—shades of red, yellow, brown, olive, or gray
Texture (fine-earth fraction)—fine sandy loam, loamy sand, loam, or sandy clay loam colluvium/alluvium; some pedons have sandy strata below a depth of 40 inches

Cg horizon:
Color—hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2
Redoximorphic features—iron or clay depletions in shades of brown, yellow, olive, or gray and iron accumulations in shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—sandy loam, sandy clay loam, fine sandy loam, or loam colluvium/alluvium; some pedons have sandy strata below a depth of 40 inches

Zillicoa Series

Depth class: Deep
Drainage class: Well drained
Depth to seasonal high water table: More than 6.0 feet
Permeability: Slow
Parent material: Residuum affected by soil creep in the upper part, weathered from ultra mafic high-grade metamorphic rock, such as coarse-grained garnet hornblende fels
Landscape: Intermountain hills and low mountains, dominantly in the Alexander community of the Asheville Basin in the north-central part of the county
Landform: Ridges, hillslopes, and south- to west-facing mountain slopes
Landform position: Summits and side slopes
Slope range: 2 to 30 percent
Taxonomic classification: Fine, mixed, active, mesic Vertic Hapludalfs

Typical Pedon

Zillicoa loam, 8 to 15 percent slopes, stony; Buncombe County, North Carolina; from Asheville, 0.35 mile north on U.S. Highway 25 (Biltmore Avenue), about 1.0 mile west on Interstate 240, about 8.25 miles north on Interstate 26 to Exit 19 (Weaverville), 0.4 mile northwest on U.S. Highway 25 & 70, about 2.7 miles southwest on Secondary Road 1727, about 1.1 miles north along the French Broad River to the Alexander Community, 1.2 miles west on Secondary Road 1634, about 0.2 mile northeast on Knoll Top Road (private road), 100 feet northwest on a forested upper side slope; Leicester USGS topographic quadrangle; lat. 35 degrees 42 minutes 5.2 seconds N. and long. 82 degrees 38 minutes 12.7 seconds W.; NAD27:

Oe—0 to 1 inch; very dark brown (10YR2/2) partially decomposed plant material; deciduous leaves, twigs, and roots; primarily deciduous leaf litter; very friable; strongly acid; abrupt wavy boundary.
A—1 to 5 inches; very dark grayish brown (10YR 3/2) loam, dark yellowish brown (10YR 4/4) dry; weak fine and medium granular structure; very friable; many fine to medium and few coarse roots throughout; common fine to coarse interstitial pores; few fine rounded iron-manganese concretions; 2 percent, by volume, gravel, 6 percent cobbles, and 2 percent stones that are coarse-grained garnet hornblende fels; moderately acid; clear smooth boundary.
BA—5 to 10 inches; dark yellowish brown (10YR 4/4) loam; few fine and medium distinct strong brown (7.5YR 4/6) mottles; moderate fine and medium granular structure; friable; slightly sticky, nonplastic; common fine and medium roots throughout; common fine to coarse tubular and interstitial pores; many fine very dark brown (10YR 2/2) iron-manganese masses on faces of peds; few rounded iron-manganese concretions; 4 percent, by volume, gravel, 2 percent cobbles, and

2 percent stones that are coarse-grained garnet hornblende fels; slightly acid; gradual wavy boundary.

Bt—10 to 20 inches; dark yellowish brown (10YR 4/6) clay; few medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; sticky, plastic; few fine and medium roots between peds; few fine and medium interstitial and common fine tubular pores; few faint discontinuous yellowish brown (10YR 5/6) clay films; common fine very dark brown (10YR 2/2) iron-manganese masses on faces of peds and in pores; moderately acid; gradual wavy boundary.

Btss—20 to 34 inches; yellowish brown (10YR 5/6) clay; strong medium subangular blocky structure; very firm, very sticky, very plastic; few very fine roots between peds; few very fine and fine tubular pores; common striated and polished slickensides 7 to 10 cm wide and 5 to 15 cm long; many faint continuous yellowish brown (10YR 5/4) clay films on faces of peds; common medium very dark brown (10YR 2/2) discontinuous manganese or iron-manganese masses; common fine cylindrical iron-manganese concretions; neutral; gradual wavy boundary.

B´t—34 to 37 inches; dark yellowish brown (10YR 4/6) clay; moderate medium subangular blocky structure; very firm; sticky, very plastic; few very fine roots between peds; few very fine tubular pores; many faint continuous clay films; medium very dark brown (10YR 2/2) discontinuous iron-manganese masses on faces of peds; many fine rounded iron-manganese concretions; neutral; gradual irregular boundary.

BC—37 to 49 inches; dark yellowish brown (10YR 4/4) sandy clay loam; few medium distinct reddish yellow (7.5YR 6/8) mottles; moderate fine and medium subangular blocky structure; friable; nonsticky, nonplastic; few very fine and fine roots between peds; common very fine tubular pores; very few faint discontinuous clay films on faces of peds; few medium very dark brown (10YR 2/2) iron-manganese masses; many fine rounded iron-manganese concretions; neutral; gradual wavy boundary.

Cr—49 to 60 inches; weathered coarse-grained garnet hornblende fels bedrock that can be dug with difficulty with a spade; partly consolidated in place; few very fine tubular pores; bedrock fragments have black (10YR 2/1) manganese masses; neutral.

Range in Characteristics

Solum thickness: 40 to 60 inches

Depth to bedrock: 40 to 60 inches to weathered bedrock; more than 60 inches to unweathered bedrock

Content of mica flakes: Few or common

Content and size of rock fragments: Less than 35 percent, by volume, throughout the profile; dominantly gravel and cobbles but including stones

Soil reaction: Strongly acid to slightly acid in the upper horizons and moderately acid to slightly acid in the lower horizons

Vertic feature: Coefficient of linear extensibility (COLE) measured 7.2 cm in the upper meter; shrink-swell properties are enhanced due to the high proportion of fine clay (80 percent of total clay is fine clay)

Other characteristics: Base saturation by sum of cations is 35 to 60 percent at 1.25 meters below the top of the argillic horizon

A or Ap horizon:

Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6; where value is 2 or 3, the horizon is less than 6 inches thick

Texture (fine-earth fraction)—clay loam or sandy clay loam

E horizon (if it occurs):

Color—hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 2 to 4

Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, or sandy clay loam

BA or BE horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—sandy loam, fine sandy loam, loam, or sandy clay loam

Bt horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8
Nonredoximorphic features—mottles with high and low chroma are in the lower part of the horizon in some pedons
Texture (fine-earth fraction)—clay or clay loam

Btss horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8
Nonredoximorphic features—mottles with high and low chroma are in the lower part of the horizon in some pedons
Texture (fine-earth fraction)—clay or clay loam
Other characteristics—slickensides at least 5 cm long and 5 cm wide; horizon is at least 6 inches thick

B´t horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8
Texture (fine-earth fraction)—clay or clay loam

BC or CB horizon (if it occurs):
Color—hue of 7.5YR to 5Y, value of 3 to 6, and chroma of 3 to 8
Texture (fine-earth fraction)—clay loam, sandy clay loam, sandy loam, or loam

C horizon (if it occurs):
Color—horizon has hue of 7.5YR to 5Y, value of 3 to 6, and chroma of 3 to 8 and may be mixed or mottled in shades of these colors
Mottles—shades of red, brown, yellow, or olive
Texture (fine-earth fraction)—loam, fine sandy loam, loam, sandy clay loam, or clay loam

Cr layer:
Type of bedrock—weathered, weakly to strongly cemented, ultra mafic, mafic, or intermediate high-grade metamorphic rock
Excavation difficulty—moderate or high
Other characteristics—few fine and medium roots in cracks that are spaced more than 4 inches apart

Formation of the Soils

This section describes the factors of soil formation and relates them to the soils in the survey area. It also discusses the processes of horizon differentiation and the geology of Buncombe County.

Factors of Soil Formation

A soil is a three-dimensional natural body consisting of mineral and organic material that can support life. The nature of any soil at a given site is a result of the interaction of five general factors—parent material, climate, plants and animals, relief, and time. Climate and plants and animals have an effect on parent material that is modified by relief over time. Theoretically, if all these soil-forming factors were identical at different sites, the soils at these sites would be identical. Differences among soils are caused by variations in one or more of these factors.

Parent Material

Parent material is the unconsolidated mass in which soil forms. It is derived from the physical and chemical breakdown of rocks. The physical and chemical composition of parent material has an important effect on the kind of soil that forms. Parent material influences the amount of sand, silt, and clay in a soil as well as acidity, color, erodibility, depth to bedrock, resistance to weathering, and other soil characteristics that affect use and management. For example, the amount of clay in a soil is directly related to the minerals that occur in the parent material. The amount of clay affects such factors as workability, fertilizer and water retention, and the performance of septic tank filter fields.

The soils of Buncombe County formed from parent material that slowly accumulated from the weathering of consolidated bedrock or has been transported and deposited by the forces of water and gravity. Major differences in parent material, such as texture, can be observed in the field. Less distinct differences, such as mineralogical composition, are determined by careful laboratory analysis. There are three categories of parent material in Buncombe County—residuum, colluvium, and alluvium (fig. 60).

Residuum

Residuum occurs throughout the county on ridgetops and side slopes of intermountain hills and low, intermediate, and high mountains. Residual parent material is the result of bedrock weathering in place. The kind and thickness of the residuum is, in part, related to the mineral composition of the consolidate bedrock and its degree of resistance to weathering (figs. 61 and 62). In Buncombe County, residuum is derived from three general rock types—low-grade metasedimentary, felsic high-grade metamorphic, and mafic high-grade metamorphic.

Low-grade metasedimentary rocks, such as phyllite, metasandstone, and metagraywacke, are the parent material for Soco, Junaluska, Sylco, and Jeffrey soils.

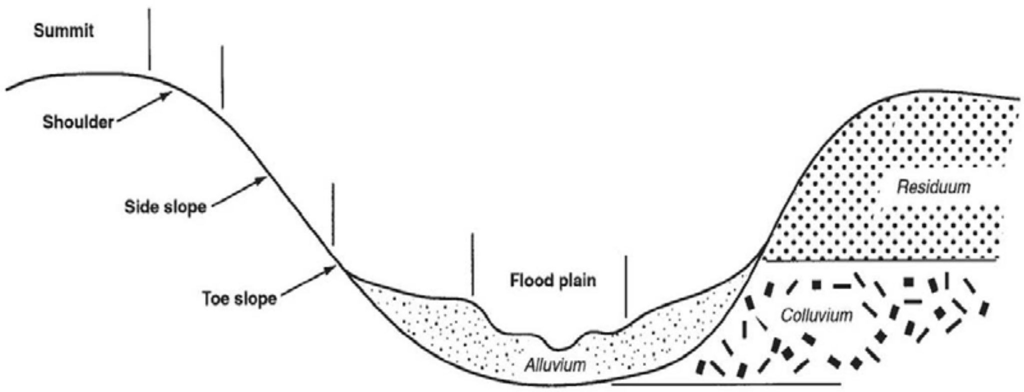

Figure 60.—Relationship of landform positions and parent material.

These soils are brown, yellow, or red, have bedrock dominantly at a depth of less than 60 inches, and are low in natural fertility. They occur in the northwestern and southeastern parts of the county near the Sandymush and Fairview communities.

Felsic high-grade metamorphic rocks, such as granite, gneiss, and schist, weather into the parent material for Wayah, Burton, Porters, Chestnut, Edneyville, Cleveland, and Ashe soils. These soils vary in depth and color due to the degree of resistance to weathering exhibited by the parent material and the variation in mineral composition. They occur throughout most of the county.

Mafic high-grade metamorphic rocks, such as amphibolite and metagabbro, yield parent material that is rich in clay-forming minerals. Clifton soils are the dominant soils formed from this residuum. They are red and very deep and have relatively higher natural fertility. Evard and Cowee soils at the upper limit of their clay content range occur in areas of these rocks. Other mafic rocks, such as migmatitic biotite-hornblende and biotite-hornblende gneiss, are the parent material for Walnut, Mars Hill, and Oteen soils. These soils vary in depth, color, and clay content due to the degree of resistance to weathering exhibited by the parent material and the variation in mineral composition. These soils occur throughout the north-central part of the county and are dominant in the Canto, Alexander, Weaverville, and Democrat communities. Zillicoa soils formed over coarse-grained garnet hornblende fels. These soils have the highest clay content in Buncombe County and only occur near the community of Alexander.

Colluvium

Colluvium is distributed throughout Buncombe County in coves, on benches, on footslopes, on toeslopes, and in sloping drainageways. Colluvial soils formed in parent material that has slid or fallen downslope under the influence of gravity. This occurs slowly over time or by sudden movements. These soils are loamy and very deep and contain angular to subrounded rock fragments that increase in quantity as depth increases. Surface stones and boulders are common. Soils that formed in colluvium are Tate, Toecane, Tusquitee, Whiteside, Northcove, Maymead, Heintooga, and Chiltoskie. Dillard, Statler, and Hemphill soils are unique in that they formed in colluvium on toeslopes and old alluvium on low terraces. Unison, Braddock, Kanuga, and Swannanoa soils formed in old alluvium on high terraces. Unison soils also formed in colluvium in coves.

Large mountain coves are the result of sudden, swift mass movements called debris avalanches. These avalanches produce extremely stony and bouldery

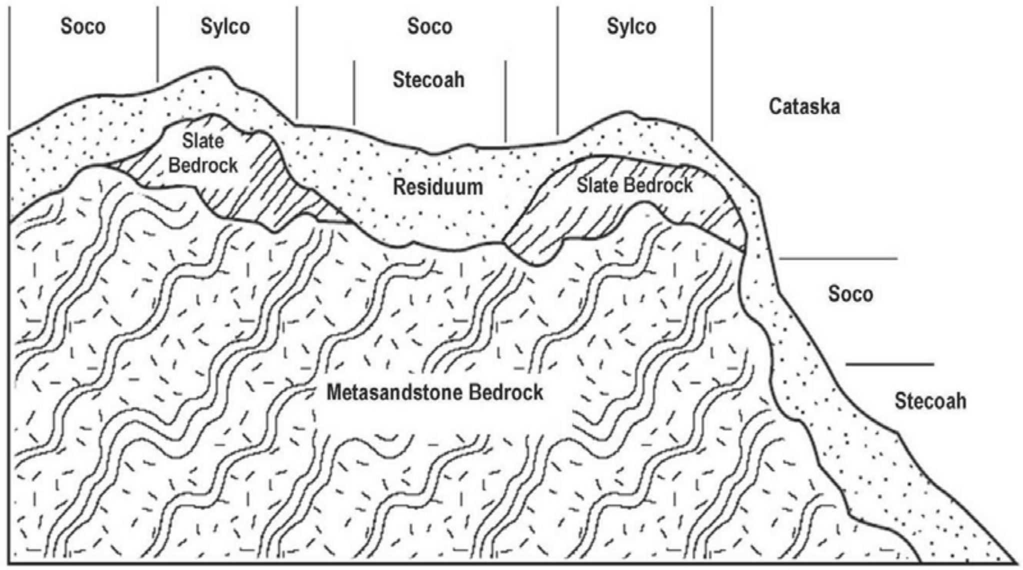

Figure 61.—A cross section of the soils of the Soco-Sylco-Stecoah-Cataska general soil map unit. Areas of slate are thinly bedded, more resistant to weathering, and typically shallower to bedrock. Soils are variable in these areas due to the natural fluctuation of the rock layers.

colluvium (fig. 63). Smaller cove and footslope landscapes are scattered throughout the mountains. Soils in these colluvial areas contain fewer rock fragments and were deposited by a slower process called soil creep. Upland soils that have steep or very steep slopes typically formed from a combination of residuum and soil creep material.

Alluvium

Alluvium is soil material or rock fragments, or both, that have been deposited by moving water. Soils that formed in recent alluvium are on active flood plains along the larger streams and the French Broad and Swannanoa Rivers. Alluvial soils have very little development because the soil-forming processes are interrupted by each flooding event. The texture of the alluvial material varies, depending on the speed of the flood water, the duration of flooding, and the distance from the streambank. Alluvial soils are usually stratified with increasing quantities of rounded rock fragments. Soils that formed in old alluvium occur on the higher stream terraces and on some hillslopes, which are typically adjacent to flood plains. Stream terraces are the remnants of ancient, higher floodplain levels, and most are no longer subject to deposition by recent alluvium.

Soils that formed in recent alluvium can be coarse or fine textured, depending upon their location on the flood plain. Coarse textured soils commonly occur adjacent to the stream channel and on the upper reaches of flood plains, near the base of the mountains.

These soils do not have a high degree of profile development and consist mainly of sand or sand and gravel. Fine textured alluvium is deposited on the main part of the flood plain and in backwater areas adjacent to uplands. Soils that formed in fine textured alluvium have moderate profile development and predominantly loamy textures. In general, soils closest to the headwaters show the least soil development and are shallower to strata with a high content of rock fragments. Dellwood, Reddies, and Nikwasi soils formed in these areas. Flood plains farther downstream receive finer parent material that has undergone more mechanical weathering, and the soils show slightly more development. French, Rosman, and Iotla soils formed in these areas.

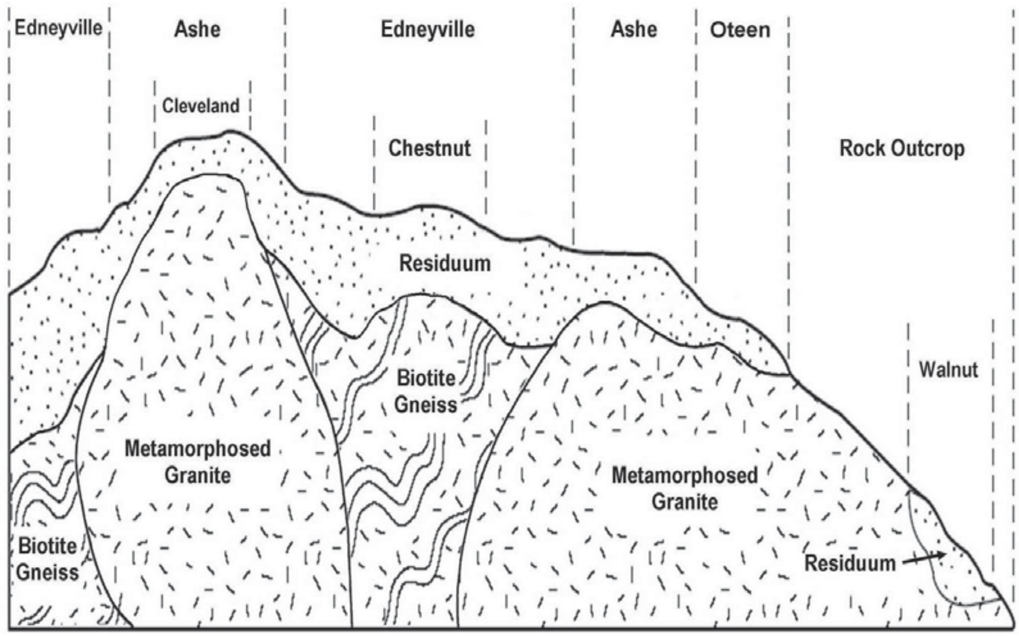

Figure 62.—A cross section of the soils of the Cleveland-Ashe-Rock outcrop-Oteen general soil map unit. Areas of metamorphosed granite are more resistant to weathering. Soils in these areas are shallower to bedrock than soils in other areas.

Adjacent to the largest streams and the French Broad and Swannanoa Rivers, where flooding is frequent and velocity is high, sandy Biltmore soils formed (fig. 64).

Soils that formed in old alluvium occur on higher stream terraces and on some hillslopes, which are typically adjacent to flood plains. Stream terraces are the remnants of ancient, higher floodplain levels, and most are no longer subject to deposition by recent alluvium.

Soils on stream terraces and footslopes that formed in old alluvium have well developed profiles and horizons. They have a loamy or clayey subsoil, depending upon the geologic time period in which the alluvium was deposited. Soils that have a clayey subsoil formed in the most ancient alluvial deposits. Loamy soils formed in less ancient alluvium. Dillard, Statler, and Hemphill soils are unique in that they formed in colluvium on toeslopes and in old alluvium on low terraces. Unison, Braddock, Kanuga, and Swannanoa soils formed in old alluvium on high terraces. Unison soils also formed in colluvium in coves.

Parent material in the county is a major factor in determining what kind of soil forms and can be correlated to some degree to geologic formations. The general soil map can serve as an approximate guide to the geology of the county.

Climate

Climate affects the chemical, biological, and physical relationships in the soil primarily through the influences of precipitation and temperature. Annual rainfall varies considerably across the county. It ranges from 35 to 40 inches north of Alexander in the northern part of the county to more than 70 inches on Mt. Pisgah in the southwestern part of the county. Rainwater, a weak acid, chemically dissolves rocks,

Figure 63.—Large boulders, resulting from ancient debris flows, are common on Toecane very cobbly loam, 30 to 50 percent slopes, extremely bouldery.

minerals, and organic matter, releasing the nutrients needed for life in the soil. Water transports organic matter, soil particles, and nutrients through the soil. The effects of climate also control the biological relationships among plants and other soil life. Temperature influences the kind and growth of organisms and the speed of physical and chemical reactions in the soil. The freeze-thaw cycle also affects the formation of soils by assisting in the breakdown of rock into parent material.

Localized microclimates, the result of unique combinations of climate, aspect, landscape position, and elevation, are important to the soil-forming process (fig. 65). For example, the high amounts of rainfall and cool temperatures of high mountains produce brown, medium textured soils that have a high content of organic matter in the surface layer. The warmer temperatures and the lower amounts of rainfall of the low mountains produce red soils that have less organic matter in the surface layer and more clay in the subsoil. Both areas host distinctly different plant and animal communities, indicating that unique environmental factors are at work.

Plant and Animal Life

Plant and animal life influences the formation of soil and the differentiation of soil horizons. The kind and number of organisms that exist in and on the soil are determined to a large extent by climate and by parent material, relief, and the age of the soil. Bacteria, fungi, and other microscopic organisms aid in the weathering of rock, the decomposition of organic matter, and the mixing of the surface layers. The larger plants and animals furnish organic matter and transfer elements from the subsoil to the surface soil. Soil properties affected include color, structure, reaction, and the content and distribution of organic matter.

Trees and plants take up nutrients from deeper parts of the soil and add them to the surface as leaves, twigs, roots, etc. This organic matter is chemically and physically altered by micro-organisms, earthworms, and higher forms of life. The nutrients are

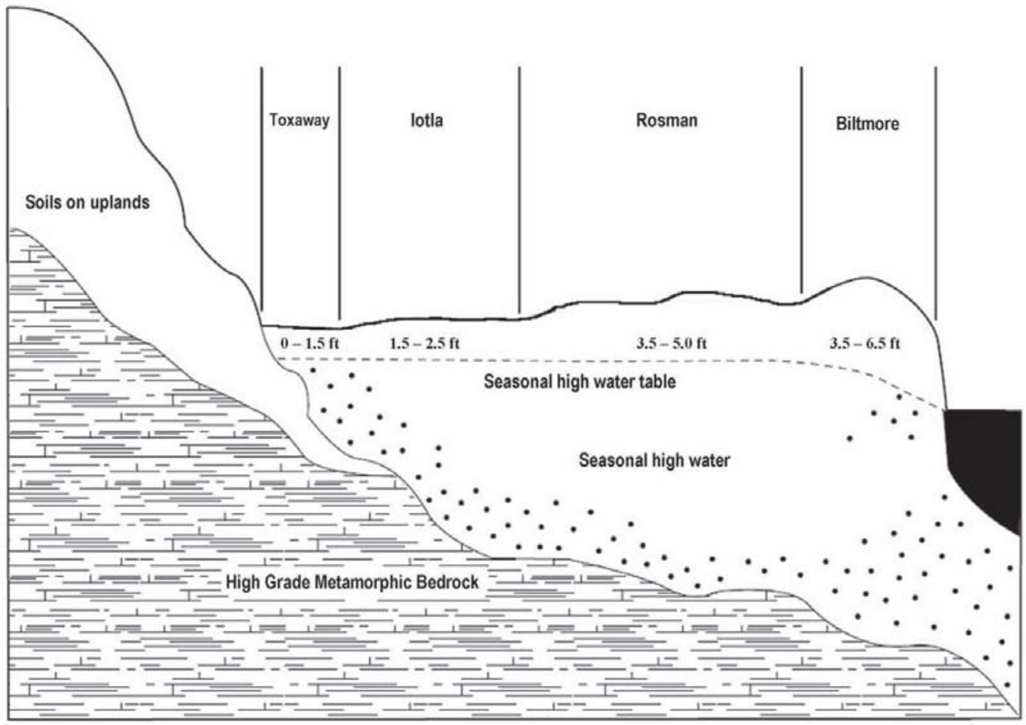

Figure 64.—A cross section showing the relationship between floodplain soils and a seasonal high water table.

mineralized and leach into the root zone. Other plants take up these nutrients, continuing the cycle. This process is called biocycling. Where deep-rooted plants are removed, the accumulated nutrients are lost from the system.

Human activity has significantly influenced soil formation. Native forests have been cleared for farming and other uses. Cultivation has accelerated erosion on sloping soils, wet soils have been drained, and manure, lime, chemical fertilizer, and pesticides have been applied across the landscape. Cultivation has affected soil structure and lowered organic matter content. The development of land for urban uses or for mining has significantly influenced the soil in some areas.

Relief

The relief or topography in Buncombe County is a result of mountain building, slope retreat, and the dissection of the land surfaces by major streams and tributaries. Slope retreat and dissection of the land surface are controlled by the hardness of the bedrock and the amount of uplift in the area. Relief, in turn, influences soil formation by creating differences in internal drainage, surface runoff, geologic erosion, soil temperature, and plant cover. Mountains also influence weather patterns and thus local climate.

Internal drainage of the soil is affected by its position on the landscape. Soils on ridgetops and side slopes are well drained while soils at the base of slopes and in coves can be affected by seeps and springs. On flood plains, soils next to the streams are often well drained while soils farther back can have a high water table.

Surface runoff and geologic erosion increase as slope increases. This reduces the amount of water that percolates through the soil. Thus soils on steep side slopes are less developed. Soil creep also influences soil formation on mountainous terrain.

Figure 65.—Aspect, elevation, and relief influence soil formation. Microclimates on cool and shaded slopes have higher moisture and organic matter contents and lower soil temperature.

Generally, the upper part of most soils on side slopes formed in material that is very slowly moving downslope. The extent of soil creep is controlled by time, steepness of slope, and slope length. Soils that formed on ridgetops and shoulder slopes are much less affected by soil creep and may be the only completely residual soils. Generally, soil depth increases downslope. Maximum soil thickness occurs in concave areas, in coves, on footslopes, and on toeslopes.

Relief influences soil temperature, moisture, and organic matter content through aspect and elevation. For example, south- to west-facing slopes receive direct sunlight and warm up earlier in the spring. Soils on north- to east-facing slopes and those shaded by the higher mountains are cooler, retain moisture, and thus have a higher content of organic matter in the surface layer. Conditions are similar at elevations above 4,000 feet which are cooler and receive more rainfall. Together these conditions affect soil formation by regulating plant and animal activity and the weathering process.

Time

The amount of time parent material has been exposed to the soil-forming processes accounts for some of the differences between soils. The horizons in a soil profile also take a long time to develop. This development proceeds at a rate dependent upon climate, relief, parent material, and the activity of plants and animals. Soil formation is a function of geologic time although flooding, erosion, and landslides affect soils in a human time frame.

The soils of Buncombe County vary considerably in age. The oldest soils occur on warm, stable uplands. Clifton, Fannin, and Evard soils are examples. Older soils generally have had more time for clay to form, move, and accumulate. Their horizons are more defined than those of young soils.

Most soils in the county are relatively young and less developed. On uplands, some of these soils are Edneyville, Chestnut, Porters, Soco, and Stecoah. One reason these soils have not had time to develop further is due to steepness of slope. Geologic erosion and the percolation of water downslope instead of through the soil work against soil formation. The soils at high elevations, such as Wayah, Burton, and Oconaluftee, are young partially due to climatic factors that have not allowed enough time for favorable temperatures to drive soil development.

In coves, Toecane, Northcove, Maymead, Heintooga, and Chiltoskie are examples of young soils. These soils are on more active landscapes where they receive material from geologic erosion. In addition, water moves through these soils as seeps and springs, carrying clay particles out of the soil. Heintooga and Chiltoskie soils are further slowed in their development by the cold climate in which they occur.

The youngest soils formed in alluvium on flood plains. This landscape is also less stable or more active as flooding adds to or takes away soil material. Examples of the youngest soils are Dellwood, Reddies, Biltmore, and French.

Processes of Horizon Differentiation

One or more soil-forming processes are involved in the formation of soil horizons. These processes are the accumulation of organic matter; the leaching of bases and other soluble material; the chemical weathering, mainly by hydrolysis, of primary minerals into silicate clay minerals; the translocation of silicate clay and some silt-sized particles from one horizon to another; and the reduction and transfer of iron. These processes are also referred to as additions, removals, transfers, and transformations.

Some organic matter has accumulated in all of the soils in the survey area. Most of the soils contain moderate amounts of organic matter in the surface layer. The content of organic matter ranges from low, as in Clifton soils, to very high, as in Wayah soils.

Most of the soils in the survey area are acid in the upper layers, unless the surface layer has been limed. The leaching of bases occurs with the percolating of water down through the soil profile. The relatively high amounts of rainfall over geologic time have created acid conditions in the soils of Buncombe County. Walnut, Mars Hill, and Oteen soils that formed over mafic rocks in areas of the Canto, Alexander, Leicester, Weaverville, and Democrat communities are exceptions.

The translocation of clay minerals is an important process in the development of many soils in the survey area. As clay minerals are removed from the A horizon, they accumulate as clay films on the faces of peds, in pores, and in root channels in the B horizon. The amount of translocated clay is low in Buladean and Stecoah soils and high in Evard and Clifton soils.

As silicate clay forms from primary minerals, some iron is commonly released as hydrated oxides. These oxides are generally red. Even if they occur in small amounts, they give the soil material a brownish color. They are largely responsible for the strong brown, yellowish brown, reddish brown, or red colors that are dominant in the subsoil of soils in the survey area.

The reduction and transfer of iron has occurred in all of the soils that are not characterized by good natural drainage. This process, known as gleying, is evidenced by a gray matrix color and by iron or clay depletions. Some of the iron may be reoxidized and segregated and thus form yellow, brown, red, or other brightly colored masses of iron accumulation in an essentially gray matrix in the subsoil. Nodules or concretions of iron or manganese also commonly form as a result of this process. Soil features associated with chemically reduced iron are referred to as redoximorphic features *(23)*. Somewhat poorly drained French soils and poorly drained Hemphill soils display many of these features.

Geology and Soils of Buncombe County

Carl E. Merschat and Bart L. Cattanach, Area Geologists, North Carolina Geological Survey, North Carolina Department of Environment and Natural Resources, prepared this section.

Physiography

The mountainous area of western North Carolina is part of the Appalachian Mountain system that extends from Alabama to easternmost Canada. The Appalachians are complex with numerous different sections, each characterized by very distinct geologically controlled topographic features. These sections are called physiographic provinces. Buncombe County is located in the Southern Blue Ridge Physiographic Province of the Appalachian Mountain system *(8)*. The county is in the Blue Ridge Highlands subdivision. The Blue Ridge Highlands is characterized by a complex, irregular pattern of mountain ranges, intermontane basins, and trench valleys. Approximately one-half of the county lies in the Asheville Basin with mountains making up the perimeter to the north, east, and west. Contour levels between 2,300 and 2,400 feet in elevation define the upper surface of the basin. The basin has a jagged, irregular border because intervening ridges from the adjacent highlands extend some distance into the basin *(9)*.

Although mountainous terrain dominates the landscape of Buncombe County, parts of the county lie in low areas, such as the Asheville Basin. Rock type controls the topography but not as strikingly as in other parts of western North Carolina. Typically, areas underlain by resistant quartz-rich, metasedimentary rocks form the higher mountains. An exception to this can be found in the extreme southeastern part of the county where massive granites make up the high mountains. Intermontane basins and trench valleys developed on less-resistant rock types or in some cases are the result of tectonic influences, such as faults and fractures. In these low areas weathering develops to its greatest extent and a deep saprolite and residual soil develops. A relatively flat gently sloping surface is produced that is ideal for larger farms and development. Historically, towns and communities developed in the basins and trench valleys. On the steep, more mountainous terrain of the county, the depth of weathering is very shallow with little saprolite and soil. On the steepest slopes, barren rock exposures occur throughout the county *(13)*.

In addition, jointing, faulting, thickness of layering, and metamorphic grade contribute to the resistance of a rock type. Abundant and closely spaced joints and faults increase the exposed surface area of a rock and subsequently cause the rock to weather more easily and form topographic lows. Similarly, the thicker and more massive layers are usually more resistant than their thin-layered counterparts. The massive granitoid layers form a topographic high, while the more thinly layered granitoids through the same areas are topographically low.

General Geology

Metamorphosed igneous, volcanic, and sedimentary rocks ranging in age from more than one and one-half billion years to about 600 million years underlie all of Buncombe County. All are multiply metamorphosed, folded, and faulted. Other intrusives vary in age from Middle Proterozoic to Cambrian and range from granitic to ultramafic in composition *(8, 9, 13)*.

Structural Setting

Buncombe County lies in the Blue Ridge, Brevard fault zone, and western Inner Piedmont geologic provinces. These provinces and the rocks within them are a result

of continental collision and mountain building hundreds of millions of years ago (some of the rocks are as old as 1.2 billion years). Within these provinces thrust faults are the large-scale features that control the outcrop pattern and structure of the rocks. These faults form the major contacts and were responsible for transporting characteristic sequences of deformed and metamorphosed rock tens to hundreds of miles to the northwest. Each successive thrust piled rock sequences from the southeast on top of rocks to the northwest. The rocks within each thrust sheet vary in tectonic history, rock type, and metamorphism. The internal contacts within each thrust sheet may be either intrusive, stratigraphic, faulted, or some combination of the three.

Recognition and confirmation of this composite thrust sheet concept is based on geologic mapping of unmetamorphosed Paleozoic sedimentary rocks surrounded by high-grade regionally metamorphosed rocks (e.g., Grandfather Mountain and Hot Springs windows). The presence of high-temperature rocks resting on top of low-temperature rocks and other field evidence indicate that the high temperature rocks were carried tens to hundreds of miles and placed above the low-temperature sedimentary rocks by thrust faults. Subsequent mapping has recognized crystalline thrust faults throughout the Blue Ridge Mountains. It is important to note that these faults have been inactive for millions of years and that they are not hazardous.

Buncombe County rocks occur in five major thrust sheets: the basement complex, the Hayesville, the Holland Mountain/Chattahoochee, the Brevard fault zone, and granites of the western Inner Piedmont. The basement complex, found in northwestern Buncombe County, is over a billion years old (Mesoproterozoic) and is made up of seven formal map units consisting primarily of granulite (felsic and mafic), granitic and granitoid gneisses, biotite gneiss, protomylonitic gneisses, amphibolite, and calc-silicate granofels *(12)*. These units underlie all other rocks in the area and for that reason are referred to as basement. The protoliths of these complexly deformed basement gneisses are not fully understood but are interpreted to be primarily igneous in nature. Age dates have identified three major time periods of igneous activity, but only the 1220 to 1270 million-year-old granitoid bodies occur in the county *(3)*. After their initial formation, the basement rocks were further modified by at least one and possibly several very high-grade metamorphic overprintings during the Grenville orogeny approximately one billion years ago. In addition at least one episode of Grenville mylonitic faulting overprints the metamorphic fabric.

The rocks found in the major thrust sheets of Buncombe County are over a billion years old (Mesoproterozoic) and consist primarily of migmatitic biotite-hornblende gneiss, layered biotite granitic gneiss, protomylonitic granitoid gneiss, biotite granitoid gneiss, biotite gneiss, granulite gneiss, and amphibolites *(11, 12)*. They underlie all other rocks in the area and for that reason are referred to as basement. The protoliths of these complexly deformed basement gneisses are not fully understood but are interpreted to be primarily igneous in nature. Age dates have identified three major time periods of igneous activity: 1020-1080 Ma (million years), 1130-1180 Ma, and 1220-1270 Ma *(3, 12)*. The basement rocks of Buncombe County are an amalgam of these plutons with each progressively younger phase intruding the older igneous bodies. This sequence of events is further complicated by at least one and possibly several very high-grade metamorphic overprintings during the Grenville orogeny approximately one billion years ago. In addition multiple zones of mylonitization (ductile deformation) overprint the metamorphic fabrics.

Rock Descriptions

Basement Complex

Geologic map units of the basement rocks include Earlies Gap Granulitic Gneisses, Earlies Gap Biotite Gneiss, Earlies Gap Biotite Gneiss Amphibolite, Sandymush Felsic

Gneiss, Sandymush Mafic Gneisses, Doggett Gap Protomylonite, migmatitic biotite-hornblende gneiss, and Spring Creek Granitoid Gneiss.

The basement gneisses were intruded by undeformed but weakly metamorphosed Neoproterozoic Bakersville Metagabbro, dunite, and altered ultramafic rocks. The Bakersville Metagabbro is common to the area underlain by the Earlies Gap Granulitic gneisses. (See geology map.)

Industrial minerals produced in these map units include crushed stone, building stone, olivine, chromite, vermiculite, corundum, and feldspar. Prospected occurrences include magnetite, marble, thorium, nickel, mica, garnet, and talc.

The dominant soils that developed from the gneisses are Buladean, Chestnut, Porters, Unaka, and Edneyville. Rock outcrops are common along the French Broad River. Additional soils included in this map area are Toecane, Tusquitee, and Tate over colluvium and Dellwood, Reddies, and French over alluvium. In addition, the dominant soils developed from the Bakersville Metagabbro are Clifton, Evard, and Cowee. Walnut, Oteen, and Mars Hill soils are the dominant soils developed from migmatitic biotite-hornblende gneiss and migmatite. At elevations above about 4,500 feet the dominant soils are Wayah and Burton.

Ashe Metamorphic Suite

In Buncombe County, the Ashe Metamorphic Suite is divided into the following four major map units: metagraywacke, garnet-mica schist, schistose metagraywacke, and conglomeratic metagraywacke. These map units cover over half of the county.

The Holland Mountain/Chattahoochee thrust sheet places Neoproterozoic (600 to 700 million-year-old) Ashe Metamorphic Suite/Tallulah Falls Formation and Alligator Back Metamorphic Suite metasedimentary and meta-volcanic rocks over the basement gneisses. (See geology map.) These sediments were deposited in far offshore marine rift basins. Interspersed with these sediments are lesser amounts of mafic volcanic rocks and ultramafic rocks. The varied clastic sediments, commonly sulfidic, were metamorphosed into high-grade metagraywackes, metaconglomerates, muscovite-biotite gneisses and schists, biotite gneisses and schists, and minor calc-silicate granofels. The mafic volcanics were metamorphosed into amphibolites whereas the ultramafics were variably affected, being completely altered in some places and relatively unaffected in others.

Industrial minerals produced from the Ashe Metamorphic Suite in Buncombe County include crushed stone, building stone, vermiculite, and low-grade iron ore. Minerals prospected for include kyanite, sillimanite, garnet, copper, high-silica quartz, and gold.

At elevations above about 3,000 feet in elevation the dominant soils developed from the muscovite-biotite gneiss unit include Edneyville, Chestnut, Micaville, Brownwood, Porters, and Unaka. Rock outcrops are common. Additional soils included in this map area are Tusquitee, Toecane, and Tate over colluvium and Dellwood and Reddies over alluvium. At elevations of approximately 3,000 feet and lower, the dominant soils are Evard and Cowee. Additional soils included in this map area are Tate over colluvium and French over alluvium.

Alligator Back Metamorphic Suite

In southeastern Buncombe County, a narrow band of Alligator Back Metamorphic Suite is mapped overlying the Ashe Metamorphic Suite. It is very similar in composition to the Ashe Metamorphic Suite and represents continued deposition in a marine rift basin. Map units include thin-layered metagraywacke and schistose metagraywacke, graphitic schist, and protomylonitic gneiss.

Graphite is the only industrial mineral prospected for in the Alligator Back Metamorphic Suite in Buncombe County.

Dunites, altered ultramafic bodies, and metagabbros occur in both the basement

gneisses and in the Ashe and Alligator Back Metamorphic Suites. The industrial mineral potential for these rocks was discussed above in the section describing the basement gneisses.

At elevations above about 3,000 feet, the dominant soils that developed from the muscovite-biotite gneiss unit include Buladean, Ashe, Cleveland, Chestnut, Micaville, Brownwood, Porters, and Unaka soils. Rock outcrops are common. Additional soils included in this map area are Tusquitee, Toecane, and Tate over colluvium and Dellwood and Reddies over alluvium. At elevations of approximately 3,000 feet and lower, the dominant soils are Evard and Cowee. Additional soils included in this map area are Tate over colluvium and French over alluvium.

Ocoee Supergroup

In the westernmost part of the county the Hayesville thrust sheet contains the Copperhill Formation kyanite-garnet-mica schist of the Ocoee Supergroup. These rocks were thrust on top of the Spring Creek granitoid gneiss and the protomylonitic Sandymush felsic gneiss. The Copperhill Formation occurs in a narrow band beneath Little Sandymush Bald and consists of fine-grained clastic sediments deposited in a marine rift basin near the margin of an ancient continent *(3)*.

No industrial minerals have been mined from these rocks. Prospected occurrences include kyanite and garnet.

The dominant soils developed from the Snowbird, Walden Creek, and Great Smoky Groups are Soco, Sylco, Cheoah, Jeffrey, Junaluska, and Brasstown. These soils and the underlying bedrock are susceptible to mass movement when lateral support is removed. Additional soils included in this map area are Northcove and Maymead, which developed over colluvium. At elevations of approximately 4,500 feet and higher, the dominant soils that developed from the Great Smoky Group unit include Oconaluftee, Guyot, and Cataloochee. Rock outcrops are common. Additional soils included in this map area are Heintooga and Chiltoskie over colluvium.

Brevard fault zone

The Brevard fault zone, a major ancient inactive fault zone of ductile deformation (mylonitization) locally over 2 miles wide, occurs in a narrow strip northeast and southwest of Fairview. This mylonitization is characterized by low-grade metamorphism with the development of sericite and/or muscovite, epidote group minerals, and chlorite. This fault zone has been reactivated many times in the geologic past. The deformation associated with this fault zone extends into the bordering rocks to the northwest and southeast. Map units within the Brevard fault zone include phyllonite/mylonite, mylonite, and marble.

Marble has been prospected for in the Brevard fault zone.

The dominant soils developed from the schist, phyllonite, and metasandstone rock types are Soco, Sylco, Stecoah, Junaluska, Brasstown, Fannin, Lauada, Micaville, and Brownwood. These soils and the underlying bedrock occur in a narrow band between the larger high-grade metamorphic geologic areas. Characteristics of the soil and bedrock are variable within a short distance, and intergraded soils are common throughout. Additional soils included in this map area are Northcove and Maymead, which developed over colluvium.

Henderson Gneiss

The southeastern corner of Buncombe County is underlain by two large granitoid plutons intrusive into rocks of the western Inner Piedmont. The largest body is the Henderson Gneiss (approximately 490 million years old), which is a granitic augen (eye-shaped) gneiss. Locally the microcline is over an inch long. The augen structures are produced by a high-temperature mylonitic overprint. The smaller body is a

medium-grained biotite quartz monzonite gneiss (438 million years old) intrusive into the Henderson Gneiss and western Inner Piedmont biotite gneiss.

The Henderson Gneiss is currently being quarried for crushed stone, and the mylonites derived from it are being used for flagstone and other building stone. In the past it was quarried for dimension stone.

At elevations above about 3,000 feet, the dominant soils developed from the Henderson Gneiss, granite gneiss, and biotite-granitic gneiss include Edneyville, Chestnut, Ashe, Cleveland, Porters, and Unaka. Rock outcrops are common. Additional soils included in this map area are Tusquitee, Toecane, and Whiteside over colluvium and Dellwood and Reddies over alluvium. At elevations of approximately 3,000 feet and lower, the dominant soils developed are Evard and Cowee. Additional soils included in this map area are Tate over colluvium and French and Rosman over alluvium.

Unmetamorphosed igneous rocks

Unmetamorphosed igneous rocks make up the most recent and the remainder of the rocks in Buncombe County. They range in composition from granite to granodiorite to trondhjemite. The most notable occurrences are in the eastern part of the county. Granitic to granodioritic pegmatites that formed through high-grade regional metamorphism occur locally in bodies too small to map at a regional scale. Trondhjemite dikes of a magmatic origin cross cut the basement gneisses, the Ashe Metamorphic Suite, and the granitic pegmatites. Both the trondhjemites and pegmatites are relatively minor components of the Blue Ridge rocks in Buncombe County.

Industrial minerals produced in these young intrusive igneous rocks include dimension stone, mica (sheet and flake), feldspar, and kaolinite/halloysite. Prospected occurrences include beryl.

All of the above rocks have been affected by at least one episode of regional (Barrovian) metamorphism during the Paleozoic era. This event is characterized by decreasing metamorphic grade from southeast to northwest. The apparent low grade of metamorphism of the Brevard fault zone units is a retrograde effect of the mylonitization on the units within and adjacent to the zone.

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Glossary

Access road. A road constructed to facilitate the use and management of the land. Access roads are designed for limited traffic and typically consist of a cut slope, a roadbed, and a fill outslope.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Allochthonous. Formed elsewhere; moved from its place or origin by earth-building forces.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Alteration zone. An area of mineralogic change in a rock brought about by physical or chemical means.

Aluminosilicate. A silicate mineral enriched in aluminum; kyanite, sillimanite, and muscovite are examples.

Amphibolite. A metamorphic rock composed mostly of an amphibole mineral (usually hornblende) and plagioclase feldspar.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Anthophyllite. An abestiform amphibole mineral that occurs in metamorphosed ultramafic rock.

Anticlinorium. A series of upfolds and downfolds in the rocks that form a general arch.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Aquifer. A water-bearing bed or stratum of permeable rock, sand, or gravel capable of fielding considerable quantities of water to wells or springs.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Arenite. A general name used for a consolidated sedimentary rock composed of sand-sized fragments irrespective of composition.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Arkose. A sandstone containing 25 percent or more feldspar generally derived from the disintegration of felsic igneous rock.

Arkosic. Feldspar content in arenites (sandstones) generally exceeding 25 percent.

Aspect. The direction in which a slope faces.

Atterberg limits. Atterberg limits are measured for soil materials passing the No. 40 sieve. They include the liquid limit (LL), which is the moisture content at which the soil passes from a plastic to a liquid state, and the plasticity index (PI), which is the water content corresponding to an arbitrary limit between the plastic and semisolid states of consistency of a soil.

Aureole. A zone surrounding an igneous intrusion in which the country rock shows the effects of contact metamorphism.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Ball and burlap harvest. A method of harvesting nursery plants in which burlap is wrapped around a ball of soil that is attached to the root system.

Bare-root harvest. A method of harvesting in which nursery plants are removed from the soil with their roots bare and are packed in moist shipping material.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Basic rock. An igneous rock composed dominantly of dark minerals. The minerals of this rock are comparatively low in silica and rich in bases, such as amphiboles, pyroxenes, biotite, and olivine.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock escarpment. An intermittent to continuous band of rock outcrop usually more than 50 feet in length and 5 feet wide. Commonly associated with moderately steep to very steep soils.

Benchmark soil. A soil of large extent that holds a key position in the soil classification system or is of special significance to farming, engineering, forestry, or other uses.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Biotite. A common rock-forming mineral consisting primarily of ferromagnesian silicate minerals. Color ranges from dark brown to green in thin section. Biotite is commonly referred to as “black mica” because of the natural black color.

Borrow pit. An open excavation from which the soil and underlying material have been removed, generally for use in road construction. Borrow pits support few or no plants without major reclamation. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Broad-based dips. Short sections of access road having a reverse grade that intercept storm water. The dips are spaced about 200 feet apart and are designed to divert water away from stream crossings or steep grades.

Cable logging. A method of moving felled trees to a landing for transport to a processing facility. Most cable logging systems involve use of a truck-mounted drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are yarded and reeled in while one end is lifted or the entire log is suspended. Because this system minimizes road construction, it is used in logging steep side slopes and for reducing operational costs.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of metasandstone, slate, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chilled margins. The border area of an igneous intrusion characterized by finer grain size than the interior of the rock mass, due to more rapid cooling.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clastic. Refers to a rock or sediment that contains broken fragments of pre-existing rocks and minerals.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clayey. A general textural term that includes sandy clay, silty clay, and clay. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) containing 35 percent or more clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The

plant cover reproduces itself and does not change so long as the environment remains the same.

COLE (coefficient of linear extensibility). See Linear extensibility.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Coastal Plain. The physiographic region of eastern North Carolina that consists of ocean-deposited sediments of sand, silt, and clay. These sediments are in level to rolling areas and vary in thickness.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvial fan. A fan-shaped area of soils deposited by mass-wasting (direct gravitational action) and local unconcentrated runoff on and at the base of steeper side slopes.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conformable. Said of the contact of an intrusive body which is aligned with the internal structures of the surrounding rocks.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness

varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cove. A gently sloping to very steep, concave colluvial area commonly located at the head of drains and along drainageways in mountainous areas. Coves are long and narrow along drainageways extending up into the mountains and become wide and bowl shaped where streams flow out of the mountains and into the valleys.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Dbh (diameter at breast height). The diameter of a tree at 4.5 feet above the ground level on the uphill side.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Delineation. Each individual area drawn on the map. Soil delineations represent landforms, such as flood plains, terraces, coves, side slopes, and ridges. They contain the named components as well as similar and dissimilar inclusions. A collection of soil delineations with the same name is called a map unit.

Denitrification. The biochemical reduction of nitrate or nitrite to gaseous nitrogen either as molecular nitrogen or as an oxide of nitrogen.

Depression (depressional area). A portion of land surrounded on all sides by higher land. These areas generally do not have outlets for drainage.

Depth class. Refers to the depth to a root-restricting layer. Unless otherwise stated, this layer is understood to be consolidated bedrock. The depth classes in this survey are:

Very shallow	less than 10 inches
Shallow	10 to 20 inches
Moderately deep	20 to 40 inches
Deep	40 to 60 inches
Very deep	more than 60 inches

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Dike. A long, narrow cross-cutting mass of igneous rock that extends to or crops out on the land surface.

Diorite. A coarse-grained igneous rock with the composition of andesite (no quartz or orthoclase). It is composed of about 75 percent plagioclase feldspars with the balance being ferromagnesian silicates.

Dispersion (soils). The breakup of compound particles, such as soil aggregates or saprolite, into single grains, resulting in a highly erosive condition. This phenomenon results from the failure of grains to adhere or bond to one another and generally is associated with a high water content in soil containing high levels of sodium.

Dissimilar inclusions (soil). Soils that affect use or management differently than the named components of a map unit. They comprise less than 25 percent of each map unit and vary from delineation to delineation. Nonlimiting dissimilar inclusions have soil properties that should not conflict with use and management. Limiting inclusions have soil properties that could interfere with use and management, and special considerations may be necessary to overcome them.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor

drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or near the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. A narrow, gently sloping to very steep, concave colluvial area along an intermittent or perennial stream.

Droughty. A restrictive feature; the soil holds too little water for plants during dry periods.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Eroded (soil phase). Because of erosion, the soil has lost an average of 25 to 75 percent of the original A horizon or the uppermost 2 to 6 inches if the original A horizon was less than 8 inches thick.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion classes. Classes based on estimates of past erosion. The classes are as follows:

Class 1.—Soils that have lost some of the original A horizon but on the average less than 25 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most areas, the thickness of the surface layer is within the normal range of variability of the uneroded soil. Class 1 erosion typically is not designated in the name of the map unit or in the map symbol.

Class 2.—Soils that have lost an average of 25 to 75 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most cultivated areas of class 2 erosion, the surface layer consists of a mixture of the original A horizon and material from below. Some areas may have intricate patterns ranging from uneroded spots to spots where all of the original A horizon has been removed.

Class 3.—Soils that have lost an average of 75 percent or more of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). In most cultivated areas of class 3 erosion, material that was below the original A horizon is exposed. The plow layer consists entirely or largely of this material.

Class 4.—Soils that have lost all of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick) plus some or all of

the deeper horizons throughout most of the area. The original soil can be identified only in spots. Some areas may be smooth, but most have an intricate pattern of gullies.

Erosion hazard. A term describing the potential for future erosion, inherent in the soil itself, in inadequately protected areas. The following definitions are based on estimated annual soil loss in metric tons per hectare (values determined by the Universal Soil Loss Equation assuming bare soil conditions and using rainfall and climate factors for North Carolina):

0 tons per hectare	none
Less than 2.5 tons per hectare	slight
2.5 to 10 tons per hectare	moderate
10 to 25 tons per hectare	severe
More than 25 tons per hectare	very severe

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Evapotranspiration. The combined loss of water from a given area through surface evaporation and through transpiration by plants during a specified period.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fault. A surface of rock rupture along which there has been differential movement.

Faulting. The process of fracturing and displacement that produces a fault.

Felsic rock. A general term for light-colored igneous rock and some metamorphic crystalline rock that have an abundance of quartz, feldspars, feldspathoids, and muscovite mica.

Fen (bog). An area of very poorly drained, organic soils that are saturated throughout most of the year. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field border. A strip of perennial vegetation (trees, shrubs, or herbaceous plants) established on the edge of a field to control erosion, provide travel lanes for farm machinery, control competition from adjacent woodland, or provide food and cover for wildlife.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the

movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, slate, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flat. A general term for a level or nearly level surface or small area of land marked by little or no relief.

Flooding. The temporary covering of the soil surface by flowing water from any source, such as overflowing streams, runoff from adjacent or surrounding slopes, and inflow from high tides. The frequency of flooding generally is expressed as none, rare, occasional, or frequent. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). The duration of flooding is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month).

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Gap. A concave, lower area between ridge crests that generally has lesser slope.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Geomorphic surface. A part of the surface of the land that represents an episode of landscape development and consists of one or more landforms. It is a mappable part of the land surface that is defined in terms of morphology (relief, slope, aspect, etc.); origin (erosional, constructional, etc.); age (absolute or relative); and stability of component landforms.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Gneiss. A coarse-grained metamorphic rock in which bands rich in granular minerals

alternate with bands that are predominantly schistose minerals. It is commonly formed by the metamorphism of granite.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Granite. A coarse-grained igneous rock dominated by light-colored minerals, consisting of about 50 percent orthoclase and 25 percent quartz with the balance being plagioclase feldspars and ferromagnesian silicates. Granites and granodiorites comprise 95 percent of all intrusive rocks.

Granitoids. A field term for a granitic-looking rock.

Granoblastic. A common metamorphic rock texture in which the mineral grains are equidimensional.

Granodiorite. A plutonic rock roughly intermediate in composition between granite and diorite.

Granofels. A field name for a medium- to coarse-grained granoblastic metamorphic rock with little or no foliation.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Gravelly spot. An area of soils where the content of rock fragments generally less than 3 inches in diameter is more than 15 percent, by volume, in the surface layer, occurring in a map unit in which the surface layer of the dominant soil or soils has less than 15 percent gravel. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Gravel pit. An open excavation in which the soil and underlying material are used as a source of sand and gravel. The excavated material is not crushed for use. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to pack (in tables). The soil material is difficult to compact using regular earth-moving equipment.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-grade metamorphic rocks. Highly metamorphosed rocks, such as gneiss and schist.

High mountains. The part of the landscape that is above an elevation of about 4,600 feet. It is dominated by frigid soil temperatures.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

High-value crop. Crops, such as tobacco, vegetables, and ornamentals, that require a high level of management, are labor intensive, and have a potential for high profit per acre.

High water table (seasonal). The highest level of a saturated zone in the soil (the apparent or perched water table) over a continuous period of more than 2 weeks in most years, but not a permanent water table.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Hydroseeding. Applying seed, fertilizer, and mulch to steep areas by spraying a mixture of those ingredients and water under pressure from a truck.

Hypersthene. A common rock-forming mineral of the orthopyroxene group; indicative of very high-grade metamorphism.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are amphibolite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermediate mountains. The part of the landscape that ranges from about 3,000 to 4,800 feet in elevation. It is dominated by mesic soil temperatures.

Intermediate rock. Igneous or metamorphic crystalline rock that is intermediate in composition between mafic and felsic rock.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Intermontane valley. A narrow, low area surrounded by mountains.

Intermountain hills. Low hills that are in valleys between mountain ranges. They are dominated by mesic soil temperatures.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Kaolinite. An aluminosilicate clay mineral with a 1:1 layer structure; that is, a silicon tetrahedral sheet alternating with an aluminum octahedral sheet. Little or no expansion occurs when water mixes with the clay.

Jointing. The presence of fractures in a rock along which there has been no displacement.

Knoll. A small, low, rounded hill rising above adjacent landforms.

K_{sat}. Saturated hydraulic conductivity. (See Permeability.)

Landfill. An area of accumulated wastes produced by human activities. These areas can be above or below the natural ground level. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Landform. Part of a landscape, such as a ridge, mountainslope, hillslope, cove, colluvial fan, drainageway, bench, and flood plain.

Landform position. Part of a landform, such as a summit, shoulder slope, nose slope, side slope, toeslope, footslope, and bottomland slope.

Landing. An area where felled trees are brought for loading and transport to a processing facility.

Landscape. A relatively large portion of land. Examples are high, intermediate, and low mountains, intermountain hills, and valleys.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones. (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Leeward. The direction downwind from the point of reference. The area protected from the elements; dry portion of a rain shadow. For example, the side of the ship towards the leeward is its lee side. A vessel heeling under the pressure of the wind is the "lower side".

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Line-out beds. Elevated planting beds where woody ornamentals and Christmas tree seedlings are grown for 1 or 2 years until they are of adequate size for planting and rapid establishment in the field.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Lit-par-lit. The penetration of layered rock by numerous, thin, roughly parallel sheets of granitic material.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy. A general textural term that includes coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of loamy very fine sand or finer textured material that contains less than 35

percent clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Locally important farmland. Additional farmland for the production of food, feed, fiber, forage, and oilseed crops, even though this land is not identified as having national or statewide importance. Land previously cleared and at least in pasture or hayland production or orchards and vineyards, seed beds and line-out beds for ornamental crop production, or Christmas tree production. Most areas require a more hands-on approach to production, less mechanization, and less ground-disturbing activities than typical row crop production. The costs of production are considered acceptable by the producer and the agricultural community.

Low mountains. The part of the landscape that ranges from about 2,500 to 3,500 feet in elevation. It is dominated by mesic soil temperatures.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low stream terrace. A terrace in an area that floods, commonly 3 to 10 feet higher in elevation than the adjacent flood plain.

Low strength. The soil has a low resistance to deforming, sliding, or failure. It is not strong enough to support loads.

Mafic rock. A dark rock composed predominantly of magnesium silicates. It can contain small amounts of quartz, feldspar, or muscovite mica.

Marine. Of, or belonging to, or caused by the sea.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mean annual increment. The average annual volume of a stand of trees from the year of origin to the age under consideration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Meta-arkose. An arkose that has undergone some degree of metamorphism.

Metagraywacke. A metamorphosed, dark gray, firmly indurated coarse-grained sandstone that consists of poorly sorted, angular to subangular grains of quartz and feldspar with a variety of dark rock and mineral fragments embedded in a complex clayey matrix.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Metasedimentary rock. Metamorphosed sedimentary rocks, such as phyllite, metasandstone, and conglomerate.

Micas. A group of silicate minerals characterized by sheet or scale cleavage. Biotite is the ferromagnesian black mica. Muscovite is the potassic white mica.

Microrelief. The concave to convex changes in the land surface occurring over a relatively short distance or within a small area, such as 1 acre.

Mine or quarry (map symbol). An open excavation from which the soil and underlying material have been removed, exposing bedrock; or the surface opening to underground mines. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Multiply metamorphosed. Metamorphosed more than once.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Muscovite. A nonferromagnesian rock-forming silicate mineral that has tetrahedra arranged in sheets. Commonly called “white mica” and sometimes called potassic mica.

Mylonitized. A rock deformed by extreme granulation and shearing. Commonly associated with faulting.

Native pasture. Pasture that has seeded naturally in native grasses. It is on slopes too steep to manage with modern machinery.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

No-till planting. A method of planting crops in which there is virtually no seedbed preparation. A thin slice of the soil is opened, and the seed is planted at the desired depth.

Nutrient leaching. The movement of soluble fertilizer (and soil-applied pesticides) by percolating water below plant roots and possibly into the water table.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent

Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Overstory. The portion of the trees in a forest stand forming the upper crown cover.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Pegmatite. A small pluton of exceptionally coarse texture, commonly formed at the margin of a batholith characterized by graphic structure. Nearly 90 percent of all pegmatites are simple pegmatites consisting of quartz, orthoclase, and minor percentages of micas.

Perched water table. A saturated zone of water in the soil standing above an unsaturated zone. It is usually caused by abrupt textural changes between soil horizons or the occurrence of compacted layers. These conditions cause percolating water to become restricted or perched within the soil.

Percolation. The movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Perennial stream. A stream, or reach of a stream, that flows continuously throughout the year.

Perennial water. An area that generally provides water for human or livestock consumption; commonly a lake, pond, river, or stream. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as “saturated hydraulic conductivity,” which is defined in the “Soil Survey Manual.” In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as “permeability.” Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Pesticide. Chemical formulations used to control insects and other animals, disease, and plant growth. Common pesticides include insecticides, animal repellents and baits, fungicides, defoliants, and herbicides. Their use and application is controlled by State and federal regulations.

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phytophthora root rot. A soil-borne disease caused by the fungus *Phytophthora*

cinnamomi. Originally introduced from Asia, the disease is spread by the movement of contaminated soil, water, or infected plant material. Out of a thousand species of woody plants that are hosts to phytophthora root rot, Fraser fir is one of the most susceptible. Growth of the disease is favored by soil and landform conditions that allow for the restricted movement of air and water in the soil. Conditions include high clay contents, saturation by high water tables, flooding and ponding, and water retention for extended periods by a high content of organic matter in the surface layer.

Piedmont. The physiographic region of central North Carolina characterized by rolling landscapes formed from the weathering of residual rock material.

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Pods. Metamorphic rock bodies that are long in one dimension and short in two dimensions with their long axis most commonly parallel to layering.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse-grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Porphyritic. Igneous rock texture in which larger crystals are set in a finer-grained ground mass.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Prime farmland. Land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. The slope ranges mainly from 0 to 8 percent.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable

vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Protolith. The unmetamorphosed rock from which a given metamorphic rock was formed by metamorphism.

Rain shadow. A region on the lee side of mountains or hills that receives significantly less rainfall than land on the windward side because prevailing winds are forced to rise, cool, and thereby lose most of their moisture by precipitation before reaching the lee while moving across the high ground. An area on the side of a mountain barrier that is sheltered from prevailing winds and rain-bearing clouds, resulting in relatively dry conditions.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma *in situ* because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Reforestation. The process in which tree seedlings are planted or become naturally established in an area that was once forested.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Ridge. A long, narrow elevation of the land surface, usually having a sharp crest and steep sides.

Ridge nose. The downward-sloping convex terminal point of a main ridge or a spur ridge.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Rime ice. Windblown ice that accumulates on tree branches mainly on exposed ridges and upper side slopes and at the higher elevations. The weight of the ice can cause branches to break.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. An area of exposed bedrock in a map unit that has less than 0.1 percent exposed bedrock. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Runoff class (surface). Refers to the rate at which water flows away from the soil over the surface without infiltrating. Six classes of rate of runoff are recognized:

Ponded.—Little of the precipitation and water that runs onto the soil escapes as runoff, and free water stands on the surface for significant periods. The amount of water that is removed from ponded areas by movement through the soil, by plants, or by evaporation is usually greater than the total rainfall. Ponding normally occurs on level and nearly level soils in depressions. The water depth may fluctuate greatly.

Very slow.—Surface water flows away slowly, and free water stands on the surface for long periods or immediately enters the soil. Most of the water passes through the soil, is used by plants, or evaporates. The soils are commonly level or nearly level or are very porous.

Slow.—Surface water flows away so slowly that free water stands on the surface for moderate periods or enters the soil rapidly. Most of the water passes through the soil, is used by plants, or evaporates. The soils are nearly level or very gently sloping, or they are steeper but absorb precipitation very rapidly.

Medium.—Surface water flows away so rapidly that free water stands on the surface for only short periods. Part of the precipitation enters the soil and is used by plants, is lost by evaporation, or moves into underground channels. The soils are nearly level or gently sloping and absorb precipitation at a moderate rate, or they are steeper but absorb water rapidly.

Rapid.—Surface water flows away so rapidly that the period of concentration is brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly moderately steep or steep and have moderate or slow rates of absorption.

Very rapid.—Surface water flows away so rapidly that the period of concentration is very brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly steep or very steep and absorb precipitation slowly.

Saddle. A localized concave dip in a main ridge where intermittent drainage commences on the adjacent side slope.

Sand. As a soil separate, individual rock or mineral fragments ranging from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a

soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy. A general textural term that includes coarse sand, sand, fine sand, very fine sand, loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of sand or loamy sand that contains less than 50 percent very fine sand, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Schist. A metamorphic rock that is dominantly fibrous or platy minerals. It has schistose cleavage and is a product of regional metamorphism.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seep. A small area on the landscape where water oozes through the soil and causes the surface to remain wet. The water does not flow on the surface.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Severely eroded spot. An area of soil that has lost an average of 75 percent or more of the original surface layer because of accelerated erosion, occurring in a map unit in which the dominant soil or soils have lost less than 25 percent of the original surface layer. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Short, steep slope. An area of soils that are at least two slope classes steeper than the named soils in the surrounding map unit. Areas identified on the detailed soil maps by a special symbol typically are long, narrow bands that are less than 2 acres in size. (See Slope.)

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05

millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar inclusions (soil). Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements. They comprise less than 50 percent of each map unit and vary from delineation to delineation.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Skeletal (soils). Soils that contain more than 35 percent, by volume, coarse fragments (gravel, cobbles, stones, and/or boulders).

Skidding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most systems involve pulling the trees with wire cables attached to a bulldozer or a rubber-tired tractor. Generally, felled trees are skidded or pulled with one end lifted to reduce friction and soil disturbance.

Skid trails. A system of bulldozer or tractor trails quickly built to allow for the skidding or pulling of felled trees by a tractor, bulldozer, or skidder to a landing for loading and transport to a processing facility.

Slate. A fine-grained metamorphic rock with well developed slaty cleavage. Formed by the low-grade regional metamorphism of shale.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, slope classes are as follows:

Nearly level	0 to 3 percent
Gently sloping	2 to 8 percent
Strongly sloping	8 to 15 percent
Moderately steep	15 to 30 percent
Steep	30 to 50 percent
Very steep	50 to 95 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow air drainage. Cold, moist, heavy air moves slowly (drains) up and down valleys and coves and in drainageways. Where this air accumulates in low areas, frost pockets occur.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth’s surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil compaction. An alteration of soil structure that ultimately can affect the biological and chemical properties of the soil. Compaction decreases the extent of voids and increases bulk density.

Soil creep. The slow mass movement of soil and soil materials downslope, primarily under the influence of gravity, facilitated by water saturation and by alternating periods of freezing and thawing.

Soil map unit. A kind of soil or miscellaneous area or a combination of two or more soils or one or more soils and one or more miscellaneous areas that can be shown at the scale of mapping for the defined purposes and objectives of the soil survey. Soil map units generally are designed to reflect significant differences in use and management among the soils of a survey area.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Soil strength. The load-supporting capacity of a soil at specific moisture and density conditions.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Specialty crop. A crop, such as Fraser fir grown for use as Christmas trees, that requires intensive management and a specific combination of soils and climate.

Spring. A small area on the landscape where water flows naturally through the soil onto the surface.

Spur ridge. A sharply convex portion of a mountain side slope extending from the main ridge to some point at a lower elevation.

Stand density. The degree to which an area is covered with living trees. It is usually expressed in units of basal areas per acre, number of trees per acre, or the percentage of ground covered by the tree canopy as viewed from above.

Statewide important farmland. Additional farmland of statewide importance includes land that is nearly prime farmland and that economically produces high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. In general, soils that do not quite meet the requirements for prime farmland fall into this category. This could be due to steepness of slope, permeability, susceptibility to erosion, low available water capacity, or some other soil property. The following criteria were selected to help define farmland of statewide importance in North Carolina:

1.—Slopes shall not exceed 15 percent.

2.—Stony, very stony, extremely stony, very cobbly, and bouldery phases are excluded.

3.—Severely eroded phases are excluded.

4.—Wet soils that have very slow permeability (<0.06 in/hr) are excluded.

5.—Somewhat poorly drained, poorly drained, and very poorly drained soils that are not drained are excluded.

6.—Soils that are frequently flooded during the growing season are excluded.

7.—Soils that are droughty, having 3 inches or less available water capacity to a limiting layer or a depth of 40 inches, are excluded.

8.—Rocky phases or soils that have rock outcrop in the map unit name are excluded.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of

an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stony spot. An area where 0.01 to 0.1 percent of the surface is covered by rock fragments larger than 10 inches in diameter. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsidence. A pronounced reduction in volume in some drained soils because of the removal of water, shrinkage of organic material, and the oxidation of organic compounds. Generally associated with soils that have a high content of organic matter.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in content of organic matter than the overlying surface layer.

Suitability ratings. Ratings for the degree of suitability of soils for pasture, crops, woodland, and engineering uses. The ratings and the general criteria used for their selection are as follows:

Well suited.—The intended use may be initiated and maintained by using only the standard materials and methods typically required for that use. Good results can be expected.

Suited.—The limitations affecting the intended use make special planning, design, or maintenance necessary.

Poorly suited.—The intended use is difficult or costly to initiate and maintain because of certain soil properties, such as steep slopes, a severe hazard of erosion, a high water table, low fertility, and a hazard of flooding. Major soil reclamation, special design, or intensive management practices are needed.

Unsuited.—The intended use is very difficult or costly to initiate and maintain, and thus it generally should not be undertaken.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification

system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a stream, a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topography. The relative positions and elevations of the natural or manmade features of an area that describe the configuration of its surface.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Ultramafic. A plutonic rock composed chiefly of mafic minerals, frequently monomineralic rocks.

Underlying material. Technically the C horizon; the part of the soil below the biologically altered A and B horizons.

Understory. The trees and other woody species growing under a more or less continuous cover of branches and foliage formed collectively by the upper portions of adjacent trees and other woody growth.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Very stony spot. An area where 0.1 to 3.0 percent of the surface is covered by rock fragments larger than 10 inches in diameter. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size.

Vitreous. Having the appearance and luster of glass.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Water table (apparent). A thick zone of free water in the soil. The apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table (perched). A saturated zone of water in the soil standing above an unsaturated zone.

Water turnouts. Small, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and to divert water off and away from the road surface.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse-grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wetness. A general term applied to soils that hold water at or near the surface long enough to be a common management problem.

Wet spot. An area of somewhat poorly drained to very poorly drained soils that are at least two drainage classes wetter than the named soils in the surrounding map unit. Areas identified on the detailed soil maps by a special symbol typically are less than 2 acres in size. (See Drainage class.)

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windswept. A phase of a soil map unit where hardwood trees have been stunted, twisted, and gnarled due to exposure to high winter winds and frequent ice storms.

Windthrow. The uprooting and tipping over of trees by the wind.

Windward. The direction from which the wind is blowing at the time in question. The area exposed to the elements; the wet portion of a rain shadow. For example, the side of a ship which is towards the windward is the weather side. If the vessel is heeling under the pressure of the wind, this will be the "higher side."

Yarding paths. The paths left by cable-yarded logs as they were pulled uphill or downhill to a nearby area.

Yield (forest land). The volume of wood fiber from trees harvested in a certain unit of area. Yield is usually measured in board feet or cubic feet per acre.

Tables

Table 1.—Temperature and Precipitation

(Recorded in the period 1971-2000 at Asheville Regional Airport, North Carolina)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temp. higher than--	2 years in 10 will have-- Minimum temp. lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snow-fall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January--	45.9	25.8	35.8	70	0	9	4.06	2.15	5.74	7	4.7
February-	50.0	28.0	39.0	74	7	16	3.83	1.73	5.63	6	3.3
March----	57.7	34.9	46.3	80	15	70	4.59	2.51	6.43	8	2.5
April----	66.5	41.8	54.1	86	26	189	3.50	1.53	5.19	6	0.6
May------	73.5	50.6	62.0	87	32	402	4.42	2.35	6.23	8	0.0
June-----	80.0	58.3	69.2	91	42	601	4.38	2.08	6.37	8	0.0
July-----	83.3	62.7	73.0	94	52	741	3.87	1.65	5.76	8	0.0
August---	81.7	61.8	71.8	93	49	705	4.30	2.05	6.25	7	0.0
September	76.0	55.4	65.7	89	38	501	3.72	1.56	5.55	6	0.0
October--	67.1	43.3	55.2	83	26	213	3.18	1.06	4.94	5	0.0
November-	57.4	35.3	46.4	78	18	65	3.82	2.39	5.11	6	0.4
December-	49.3	28.8	39.0	72	7	21	3.40	1.71	4.86	6	1.7
Yearly:											
Average	65.7	43.9	54.8	---	---	---	---	---	---	---	---
Extreme	100	-16	---	95	-2	---	---	---	---	---	---
Total--	---	---	---	---	---	3,533	47.07	38.92	54.83	80	13.7

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.—Freeze Dates in Spring and Fall

(Recorded in the period 1971-2000 at Asheville Regional Airport, North Carolina)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 1	Apr. 19	May 7
2 years in 10 later than--	Mar. 27	Apr. 13	May 2
5 years in 10 later than--	Mar. 16	Apr. 2	Apr. 22
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 31	Oct. 16	Oct. 5
2 years in 10 earlier than--	Nov. 5	Oct. 21	Oct. 8
5 years in 10 earlier than-	Nov. 15	Nov. 1	Oct. 15

Table 3.—Growing Season

(Recorded in the period 1971-2000 at Asheville Regional Airport, North Carolina)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	219	185	159
8 years in 10	227	194	164
5 years in 10	243	212	176
2 years in 10	258	230	187
1 year in 10	266	239	193

Table 4.—Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
AcD	Ashe-Cleveland-Rock outcrop complex, 15 to 30 percent slopes, very stony	2,315	0.5
ArE	Ashe-Cleveland-Rock outcrop complex, 30 to 50 percent slopes, very bouldery	8,536	2.0
ArF	Ashe-Cleveland-Rock outcrop complex, 50 to 95 percent slopes, very bouldery	12,707	3.0
BaD	Balsam-Tanasee complex, 15 to 30 percent slopes, extremely bouldery	221	*
BaE	Balsam-Tanasee complex, 30 to 50 percent slopes, extremely bouldery	1,354	0.3
BeA	Biltmore loamy sand, 0 to 3 percent slopes, occasionally flooded	543	0.1
BkB2	Braddock clay loam, 2 to 8 percent slopes, moderately eroded	445	0.1
BkC2	Braddock clay loam, 8 to 15 percent slopes, moderately eroded	877	0.2
BkD2	Braddock clay loam, 15 to 30 percent slopes, moderately eroded	534	0.1
BnB	Braddock-Urban land complex, 2 to 8 percent slopes	202	*
BnC	Braddock-Urban land complex, 8 to 15 percent slopes	188	*
BpF	Breakneck-Pullback complex, windswept, 50 to 95 percent slopes, very rocky	9	*
BwD	Burton-Craggey complex, windswept, 15 to 30 percent slopes, rocky	410	*
BxE	Burton-Craggey-Rock outcrop complex, windswept, 30 to 50 percent slopes, very bouldery	1,510	0.4
BxF	Burton-Craggey-Rock outcrop complex, windswept, 50 to 95 percent slopes, very bouldery	2,261	0.5
CaE	Cataska-Sylco complex, 30 to 50 percent slopes, very rocky	64	*
CdF	Cataska-Sylco-Rock outcrop complex, 50 to 95 percent slopes, very stony	425	0.1
ChD	Cheoah-Jeffrey complex, 15 to 30 percent slopes, stony	20	*
ChE	Cheoah-Jeffrey complex, 30 to 50 percent slopes, stony	39	*
ChF	Cheoah-Jeffrey complex, 50 to 95 percent slopes, stony	79	*
CkB2	Clifton clay loam, 2 to 8 percent slopes, moderately eroded	2,279	0.5
CkC2	Clifton clay loam, 8 to 15 percent slopes, moderately eroded	19,899	4.7
CkD2	Clifton clay loam, 15 to 30 percent slopes, moderately eroded	16,711	4.0
CkE2	Clifton clay loam, 30 to 50 percent slopes, moderately eroded	2,015	0.5
CsB	Clifton sandy loam, 2 to 8 percent slopes	924	0.2
CsC	Clifton sandy loam, 8 to 15 percent slopes	2,757	0.7
CsD	Clifton sandy loam, 15 to 30 percent slopes	2,199	0.5
CuB	Clifton-Urban land complex, 2 to 8 percent slopes	2,245	0.5
CuC	Clifton-Urban land complex, 8 to 15 percent slopes	6,107	1.4
CuD	Clifton-Urban land complex, 15 to 30 percent slopes	3,496	0.8
CxE	Craggey-Rock outcrop-Clingman complex, windswept, 30 to 50 percent slopes, rubbly	597	0.1
CxF	Craggey-Rock outcrop-Clingman complex, windswept, 50 to 95 percent slopes, rubbly	1,086	0.3
DAM	Dam	47	*
DeA	Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded	1,600	0.4
DrB	Dillard loam, 1 to 5 percent slopes, rarely flooded	1,751	0.4
EdC	Edneyville-Chestnut complex, 8 to 15 percent slopes, stony	107	*
EdD	Edneyville-Chestnut complex, 15 to 30 percent slopes, stony	8,968	2.1
EdE	Edneyville-Chestnut complex, 30 to 50 percent slopes, stony	30,244	7.2
EdF	Edneyville-Chestnut complex, 50 to 95 percent slopes, stony	23,099	5.5
EvD2	Evard-Cowee complex, 15 to 30 percent slopes, moderately eroded	23,441	5.5
EvE2	Evard-Cowee complex, 30 to 50 percent slopes, moderately eroded	18,404	4.4
EvF2	Evard-Cowee complex, 50 to 95 percent slopes, moderately eroded	489	0.1
EwC	Evard-Cowee complex, 8 to 15 percent slopes, stony	1,418	0.3
EwD	Evard-Cowee complex, 15 to 30 percent slopes, stony	16,978	4.0
EwE	Evard-Cowee complex, 30 to 50 percent slopes, stony	22,387	5.3
EwF	Evard-Cowee complex, 50 to 95 percent slopes, stony	2,865	0.7
ExC	Evard-Cowee-Urban land complex, 8 to 15 percent slopes	998	0.2
ExD	Evard-Cowee-Urban land complex, 15 to 30 percent slopes	3,306	0.8
ExE	Evard-Cowee-Urban land complex, 30 to 50 percent slopes	853	0.2
FaC2	Fannin-Lauada complex, 8 to 15 percent slopes, moderately eroded	560	0.1
FaD2	Fannin-Lauada complex, 15 to 30 percent slopes, moderately eroded	1,324	0.3
FaE2	Fannin-Lauada complex, 30 to 50 percent slopes, moderately eroded	909	0.2
FnB	Fannin-Lauada-Urban land complex, 2 to 8 percent slopes	152	*
FnC	Fannin-Lauada-Urban land complex, 8 to 15 percent slopes	203	*

See footnote at end of table.

Table 4.—Acreage and Proportionate Extent of the Soils—Continued

Map symbol	Soil name	Acres	Percent
FnD	Fannin-Lauada-Urban land complex, 15 to 30 percent slopes	249	*
FrA	French loam, 0 to 3 percent slopes, occasionally flooded	5,980	1.4
HcE	Heintooga-Chiltoskie complex, 30 to 50 percent slopes, very stony	10	*
HpA	Hemphill loam, 0 to 3 percent slopes, rarely flooded	357	*
IoA	Iotla loam, 0 to 2 percent slopes, occasionally flooded	1,663	0.4
JbB	Junaluska-Brasstown complex, 2 to 8 percent slopes	327	*
JbC	Junaluska-Brasstown complex, 8 to 15 percent slopes	1,605	0.4
JbD	Junaluska-Brasstown complex, 15 to 30 percent slopes	2,911	0.7
JbE	Junaluska-Brasstown complex, 30 to 50 percent slopes	1,419	0.3
KsB	Kanuga-Swannanoa complex, 2 to 8 percent slopes	233	*
KsC	Kanuga-Swannanoa complex, 8 to 15 percent slopes	124	*
MvD	Mars Hill-Walnut complex, 15 to 30 percent slopes, stony	737	0.2
MvE	Mars Hill-Walnut complex, 30 to 50 percent slopes, stony	1,966	0.5
MvF	Mars Hill-Walnut complex, 50 to 95 percent slopes, stony	214	*
MwD	Micaville-Brownwood complex, 15 to 30 percent slopes, stony	310	*
MwE	Micaville-Brownwood complex, 30 to 50 percent slopes, stony	560	0.1
MwF	Micaville-Brownwood complex, 50 to 95 percent slopes, stony	355	*
NkA	Nikwasi loam, 0 to 2 percent slopes, frequently flooded	188	*
NtD	Northcove-Maymead complex, 15 to 30 percent slopes, very stony	506	0.1
NtE	Northcove-Maymead complex, 30 to 50 percent slopes, very stony	194	*
OwC	Oconaluftee-Guyot-Cataloochee complex, windswept, 8 to 15 percent slopes, bouldery	3	*
OwD	Oconaluftee-Guyot-Cataloochee complex, windswept, 15 to 30 percent slopes, bouldery	12	*
OwE	Oconaluftee-Guyot-Cataloochee complex, windswept, 30 to 50 percent slopes, bouldery	21	*
OwF	Oconaluftee-Guyot-Cataloochee complex, windswept, 50 to 95 percent slopes, bouldery	24	*
Pg	Pits, gravel, occasionally flooded	145	*
Pt	Pits, quarry	416	*
PwC	Porters-Unaka complex, 8 to 15 percent slopes, stony	205	*
PwD	Porters-Unaka complex, 15 to 30 percent slopes, stony	2,020	0.5
PwE	Porters-Unaka complex, 30 to 50 percent slopes, stony	7,337	1.7
PxF	Porters-Unaka complex, 50 to 95 percent slopes, rocky	11,006	2.6
RdA	Reddies sandy loam, 0 to 3 percent slopes, occasionally flooded	768	0.2
RkF	Rock outcrop-Cleveland complex, 30 to 95 percent slopes, very bouldery	2,251	0.5
RoF	Rock outcrop-Oteen complex, 30 to 95 percent slopes, very bouldery	1,147	0.3
RsA	Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded	1,329	0.3
SoD	Soco-Stecoah complex, 15 to 30 percent slopes, stony	101	*
SoE	Soco-Stecoah complex, 30 to 50 percent slopes, stony	343	*
SoF	Soco-Stecoah complex, 50 to 95 percent slopes, stony	480	0.1
StB	Statler loam, 1 to 5 percent slopes, rarely flooded	997	0.2
SyD	Sylco-Soco complex, 15 to 30 percent slopes, stony	304	*
SyE	Sylco-Soco complex, 30 to 50 percent slopes, stony	826	0.2
SzF	Sylco-Soco complex, 50 to 95 percent slopes, very stony	1,215	0.3
TaB	Tate loam, 2 to 8 percent slopes	5,042	1.2
TaC	Tate loam, 8 to 15 percent slopes	13,955	3.3
TaD	Tate loam, 15 to 30 percent slopes	7,394	1.8
TkC	Tate loam, 8 to 15 percent slopes, very stony	725	0.2
TkD	Tate loam, 15 to 30 percent slopes, very stony	2,757	0.7
TmB	Tate-Urban land complex, 2 to 8 percent slopes	855	0.2
TmC	Tate-Urban land complex, 8 to 15 percent slopes	2,886	0.7
TmD	Tate-Urban land complex, 15 to 30 percent slopes	712	0.2
TnE	Toecane very cobbly loam, 30 to 50 percent slopes, extremely bouldery	958	0.2
ToC	Toecane-Tusquitee complex, 8 to 15 percent slopes, bouldery	3,067	0.7
TpD	Toecane-Tusquitee complex, 15 to 30 percent slopes, very bouldery	17,653	4.2
TpE	Toecane-Tusquitee complex, 30 to 50 percent slopes, very bouldery	19,566	4.6
TsA	Toxaway loam, 0 to 2 percent slopes, frequently flooded	186	*
TtE	Trimont loam, 30 to 50 percent slopes, stony	305	*
TuD	Tusquitee-Toecane complex, 15 to 30 percent slopes, stony	579	0.1
TwB	Tusquitee-Whiteside complex, 2 to 8 percent slopes	423	0.1

See footnote at end of table.

Table 4.—Acreage and Proportionate Extent of the Soils—Continued

Map symbol	Soil name	Acres	Percent
TwC	Tusquitee-Whiteside complex, 8 to 15 percent slopes	984	0.2
UcB	Udifluvents, sandy, 0 to 5 percent slopes, frequently flooded	28	*
Ud	Udorthents, loamy	3,231	0.8
UfB	Udorthents-Urban land complex, 0 to 5 percent slopes, occasionally flooded	1,678	0.4
UhE	Udorthents-Urban land complex, 2 to 50 percent slopes	8,885	2.1
UkD	Unaka-Rock outcrop complex, 15 to 30 percent slopes, very bouldery	251	*
UkE	Unaka-Rock outcrop complex, 30 to 50 percent slopes, very bouldery	1,585	0.4
UkF	Unaka-Rock outcrop complex, 50 to 95 percent slopes, very bouldery	5,090	1.2
UnB	Unison loam, 2 to 8 percent slopes	757	0.2
UnC	Unison loam, 8 to 15 percent slopes	955	0.2
UnD	Unison loam, 15 to 30 percent slopes	121	*
UrB	Unison-Urban land complex, 2 to 8 percent slopes	187	*
UrC	Unison-Urban land complex, 8 to 15 percent slopes	120	*
Ux	Urban land	4,695	1.1
W	Water	3,117	0.7
WaC2	Walnut-Oteen-Mars Hill complex, 8 to 15 percent slopes, moderately eroded	560	0.1
WaD2	Walnut-Oteen-Mars Hill complex, 15 to 30 percent slopes, moderately eroded	2,041	0.5
WaE2	Walnut-Oteen-Mars Hill complex, 30 to 50 percent slopes, moderately eroded	2,890	0.7
WnF	Walnut-Oteen-Rock outcrop complex, 50 to 95 percent slopes	907	0.2
WoE	Wayah-Burton complex, 30 to 50 percent slopes, bouldery	119	*
WpF	Wayah-Burton complex, 50 to 95 percent slopes, very rocky	668	0.2
WrC	Wayah-Burton complex, windswept, 8 to 15 percent slopes, bouldery	26	*
WrD	Wayah-Burton complex, windswept, 15 to 30 percent slopes, bouldery	333	*
WrE	Wayah-Burton complex, windswept, 30 to 50 percent slopes, bouldery	668	0.2
WsF	Wayah-Burton complex, windswept, 50 to 95 percent slopes, very rocky	506	0.1
WtB	Whiteside loam, 2 to 8 percent slopes	226	*
WtC	Whiteside loam, 8 to 15 percent slopes	269	*
ZcB	Zillicoa loam, 2 to 8 percent slopes	7	*
ZcC	Zillicoa loam, 8 to 15 percent slopes	128	*
ZoD	Zillicoa loam, 15 to 30 percent slopes, stony	373	*
	Total	422,483	100.0

* Less than 0.1 percent.

Table 5.—Orchard and Ornamental Crops

(See text for definitions of "well suited," "suited," "poorly suited," and "unsuited." Please refer to the "Detailed Soil Map Units" and the "Use and management of the soils" sections for information on map unit composition, soil properties, and management concerns and considerations)

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
AcD:					
Ashe, very stony	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones
Cleveland, very stony	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
ArE, ArF:					
Ashe, very bouldery	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones
Cleveland, very bouldery	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones	Unsuited slope depth to rock large stones
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
BaD, BaE:					
Balsam, extremely bouldery	Unsuited slope large stones climate-frost	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones
Tanasee, extremely bouldery	Unsuited slope large stones climate-frost	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Poorly suited slope large stones
BeA:					
Biltmore, occasionally flooded	Unsuited flooding droughty climate-frost	Poorly suited flooding droughty low elevation	Poorly suited flooding too sandy	Poorly suited flooding droughty climate-frost	Well suited flooding droughty climate-frost
BkB2:					
Braddock, moderately eroded	Well suited	Poorly suited high clay phytophthora warm aspect	Poorly suited high clay eroded	Unsuited high clay phytophthora	Well suited high clay eroded

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
BkC2:					
Braddock, moderately eroded	Suited slope	Poorly suited high clay phytophthora warm aspect	Poorly suited high clay eroded	Unsuited high clay phytophthora slope	Suited high clay eroded slope
BkD2:					
Braddock, moderately eroded	Suited slope	Poorly suited slope high clay phytophthora warm aspect	Poorly suited slope high clay eroded	Unsuited slope high clay phytophthora	Poorly suited slope high clay eroded
BnB, BnC:					
Braddock	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Urban land	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
BpF:					
Breakneck, windswept	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate
Pullback, windswept	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate
BwD:					
Burton, windswept	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate
Craggey, windswept	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
BxE, BxF:					
Burton, windswept	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate
Craggey, windswept	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
CaE:					
Cataska, very rocky	Unsuited slope depth to rock small stones	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
CaE:					
Sylco, very rocky-------	Unsuited slope depth to rock small stones	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope small stones depth to rock	Unsuited slope small stones depth to rock
CdF:					
Cataska, very stony-----	Unsuited slope depth to rock small stones	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones
Sylco, very stony-------	Unsuited slope depth to rock small stones	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope small stones depth to rock	Unsuited slope small stones depth to rock
Rock outcrop------------	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
ChD:					
Cheoah, stony-----------	Poorly suited slope climate-frost	Suited slope	Suited slope low clay	Suited slope climate-frost	Poorly suited slope climate-frost
Jeffrey, stony----------	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
ChE:					
Cheoah, stony-----------	Poorly suited slope climate-frost	Suited slope	Poorly suited slope low clay	Poorly suited slope climate-frost	Unsuited slope
Jeffrey, stony----------	Unsuited slope depth to rock climate-frost	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
ChF:					
Cheoah, stony-----------	Unsuited slope	Unsuited slope	Unsuited slope	Unsuited slope	Unsuited slope
Jeffrey, stony ---------	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
CkB2:					
Clifton, moderately eroded-----------------	Well suited	Poorly suited high clay warm aspect phytophthora	Poorly suited high clay eroded	Unsuited high clay phytophthora slope	Well suited high clay eroded
CkC2:					
Clifton, moderately eroded-----------------	Suited slope	Poorly suited high clay warm aspect phytophthora	Poorly suited high clay eroded	Unsuited high clay phytophthora slope	Suited high clay eroded slope

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
CkD2:					
Clifton, moderately eroded	Suited slope	Poorly suited slope high clay phytophthora warm aspect	Poorly suited slope high clay eroded	Unsuited slope high clay phytophthora	Poorly suited slope high clay eroded
CkE2:					
Clifton, moderately eroded	Poorly suited slope	Poorly suited high clay phytophthora warm aspect	Poorly suited slope high clay eroded	Unsuited slope high clay phytophthora	Unsuited slope high clay
CsB:					
Clifton	Well suited	Poorly suited high clay warm aspect phytophthora	Poorly suited high clay	Unsuited high clay phytophthora slope	Well suited high clay
CsC:					
Clifton	Suited slope	Poorly suited high clay warm aspect phytophthora	Poorly suited high clay	Unsuited high clay phytophthora slope	Suited high clay slope
CsD:					
Clifton	Suited slope	Poorly suited slope high clay phytophthora warm aspect	Poorly suited slope high clay	Unsuited slope high clay phytophthora	Poorly suited slope high clay
CuB, CuC, CuD:					
Clifton	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Urban land	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
CxE, CxF:					
Craggey, windswept	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Clingman, windswept	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate
DAM:					
Dam	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
DeA:					
Dellwood, occasionally flooded	Unsuited flooding droughty climate-frost	Poorly suited flooding droughty low elevation	Poorly suited flooding too sandy small stones	Poorly suited flooding droughty small stones climate-frost	Poorly suited flooding droughty small stones climate-frost

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
DeA:					
Reddies, occasionally flooded	Unsuited flooding droughty climate-frost	Poorly suited flooding droughty low elevation	Poorly suited flooding too sandy	Suited flooding droughty climate-frost	Suited flooding droughty climate-frost
DrB:					
Dillard, rarely flooded	Poorly suited climate-frost flooding	Poorly suited high clay phytophthora flooding	Poorly suited flooding phytophthora	Poorly suited surface clay phytophthora flooding	Well suited flooding climate-frost
EdC:					
Edneyville, stony	Suited low clay slope	Poorly suited warm aspect	Suited low clay slope	Poorly suited slope	Suited slope
Chestnut, stony	Poorly suited depth to rock low clay slope	Poorly suited depth to rock warm aspect	Poorly suited low clay depth to rock slope	Poorly suited slope depth to rock	Poorly suited slope depth to rock
EdD:					
Edneyville, stony	Poorly suited slope low clay	Poorly suited slope warm aspect	Suited slope low clay	Poorly suited slope	Poorly suited slope
Chestnut, stony	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Poorly suited slope depth to rock
EdE:					
Edneyville, stony	Poorly suited slope low clay	Poorly suited slope warm aspect	Poorly suited slope low clay	Poorly suited slope	Unsuited slope
Chestnut, stony	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
EdF:					
Edneyville, stony	Unsuited slope low clay	Unsuited slope warm aspect	Unsuited slope low clay	Unsuited slope	Unsuited slope
Chestnut, stony	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope low clay depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
EvD2:					
Evard, moderately eroded	Suited slope eroded	Poorly suited slope warm aspect phytophthora	Suited slope eroded	Poorly suited slope surface clay phytophthora	Poorly suited slope eroded
Cowee, moderately eroded	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock eroded	Poorly suited slope surface clay depth to rock	Poorly suited slope depth to rock eroded

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
EvE2:					
Evard, moderately eroded	Poorly suited slope eroded	Poorly suited slope warm aspect phytophthora	Poorly suited slope eroded	Poorly suited slope surface clay phytophthora	Unsuited slope eroded
Cowee, moderately eroded	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock eroded	Poorly suited slope surface clay depth to rock	Unsuited slope depth to rock eroded
EvF2:					
Evard, moderately eroded	Unsuited slope eroded	Unsuited slope warm aspect phytophthora	Unsuited slope eroded	Unsuited slope surface clay phytophthora	Unsuited slope eroded
Cowee, moderately eroded	Unsuited slope depth to rock eroded	Unsuited slope depth to rock warm aspect	Unsuited slope depth to rock eroded	Unsuited slope surface clay depth to rock	Unsuited slope depth to rock eroded
EwC:					
Evard, stony------------	Suited slope	Suited warm aspect phytophthora	Well suited	Poorly suited surface clay phytophthora slope	Suited slope
Cowee, stony------------	Poorly suited depth to rock slope	Poorly suited depth to rock warm aspect	Poorly suited depth to rock	Poorly suited surface clay depth to rock slope	Poorly suited depth to rock slope
EwD:					
Evard, stony------------	Suited slope	Poorly suited slope warm aspect	Suited slope	Poorly suited slope surface clay	Poorly suited slope
Cowee, stony------------	Poorly suited slope depth to rock	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock	Poorly suited slope surface clay depth to rock	Poorly suited slope depth to rock
EwE:					
Evard, stony------------	Poorly suited slope	Poorly suited slope warm aspect	Poorly suited slope	Poorly suited slope surface clay	Unsuited slope
Cowee, stony------------	Poorly suited slope depth to rock	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock	Poorly suited slope surface clay depth to rock	Unsuited slope depth to rock
EwF:					
Evard, stony------------	Unsuited slope	Unsuited slope warm aspect	Unsuited slope	Unsuited slope	Unsuited slope
Cowee, stony------------	Unsuited slope depth to rock	Unsuited slope depth to rock warm aspect	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
ExC, ExD, ExE:					
Evard	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Cowee	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Urban land	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
FaC2:					
Fannin, moderately eroded	Suited slope eroded	Suited warm aspect phytophthora	Suited eroded	Poorly suited surface clay phytophthora slope	Suited eroded slope
Lauada, moderately eroded	Poorly suited depth to rock eroded slope	Poorly suited depth to rock warm aspect	Poorly suited depth to rock eroded	Poorly suited surface clay depth to rock slope	Poorly suited depth to rock eroded slope
FaD2:					
Fannin, moderately eroded	Suited slope eroded	Poorly suited slope warm aspect phytophthora	Suited slope eroded	Poorly suited slope surface clay phytophthora	Poorly suited slope eroded
Lauada, moderately eroded	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock eroded	Poorly suited slope surface clay depth to rock	Poorly suited slope depth to rock eroded
FaE2:					
Fannin, moderately eroded	Poorly suited slope eroded	Poorly suited slope warm aspect phytophthora	Poorly suited slope eroded	Poorly suited slope surface clay phytophthora	Unsuited slope eroded
Lauada, moderately eroded	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock eroded	Poorly suited slope surface clay depth to rock	Unsuited slope depth to rock eroded
FnB, FnC, FnD:					
Fannin	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Lauada	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Urban land	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
FrA:					
French, occasionally flooded	Unsuited flooding wetness climate-frost	Unsuited flooding wetness phytophthora	Poorly suited flooding wetness	Suited flooding wetness phytophthora climate-frost	Suited flooding wetness climate-frost

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
HcE:					
Heintooga, very stony---	Unsuited slope large stones climate	Unsuited slope large stones climate	Unsuited slope large stones climate	Unsuited slope large stones climate	Unsuited slope large stones climate
Chiltoskie, very stony--	Unsuited slope large stones climate	Unsuited slope large stones climate	Unsuited slope large stones climate	Unsuited slope large stones climate	Unsuited slope large stones climate
HpA:					
Hemphill, rarely flooded	Unsuited wetness climate-frost flooding	Unsuited wetness phytophthora flooding	Unsuited wetness high clay flooding	Unsuited wetness surface clay flooding	Unsuited wetness high clay flooding climate-frost
IoA:					
Iotla, occasionally flooded----------------	Unsuited flooding wetness climate-frost	Unsuited flooding wetness phytophthora	Poorly suited flooding wetness low clay	Suited flooding wetness phytophthora climate-frost	Suited flooding wetness climate-frost
JbB:					
Junaluska---------------	Poorly suited depth to rock	Poorly suited depth to rock warm aspect	Poorly suited depth to rock	Poorly suited depth to rock slope	Poorly suited depth to rock slope
Brasstown---------------	Well suited	Suited warm aspect phytophthora	Well suited	Suited phytophthora	Well suited
JbC:					
Junaluska---------------	Poorly suited depth to rock slope	Poorly suited depth to rock warm aspect	Poorly suited depth to rock	Poorly suited depth to rock slope	Poorly suited depth to rock slope
Brasstown---------------	Suited slope	Suited warm aspect phytophthora	Suited slope	Poorly suited slope phytophthora	Suited slope
JbD:					
Junaluska---------------	Poorly suited slope depth to rock	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock	Poorly suited slope depth to rock	Poorly suited slope depth to rock
Brasstown---------------	Suited slope	Poorly suited slope warm aspect	Suited slope	Poorly suited slope	Poorly suited slope
JbE:					
Junaluska---------------	Poorly suited slope depth to rock	Poorly suited slope depth to rock warm aspect	Poorly suited slope depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
Brasstown---------------	Suited slope	Poorly suited slope warm aspect	Poorly suited slope	Poorly suited slope	Unsuited slope

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
KsB:					
Kanuga	Suited climate-frost	Poorly suited high clay phytophthora	Poorly suited high clay	Poorly suited surface clay phytophthora high clay	Well suited climate-frost high clay
Swannanoa	Poorly suited wetness climate-frost	Poorly suited wetness high clay phytophthora	Poorly suited wetness high clay	Poorly suited wetness surface clay	Suited wetness high clay
KsC:					
Kanuga	Suited climate-frost slope	Poorly suited high clay phytophthora	Poorly suited high clay slope	Poorly suited surface clay phytophthora slope high clay	Suited slope climate-frost high clay
Swannanoa	Poorly suited wetness climate-frost slope	Unsuited wetness phytophthora	Poorly suited wetness high clay slope	Unsuited wetness surface clay slope	Poorly suited wetness high clay slope
MvD:					
Mars Hill, stony	Suited slope low clay	Poorly suited slope warm aspect	Suited slope low clay	Poorly suited slope	Poorly suited slope
Walnut, stony	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Poorly suited slope depth to rock
MvE:					
Mars Hill, stony	Poorly suited slope low clay	Poorly suited slope warm aspect	Poorly suited slope low clay	Poorly suited slope	Unsuited slope
Walnut, stony	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
MvF:					
Mars Hill, stony	Unsuited slope low clay	Unsuited slope warm aspect	Unsuited slope	Unsuited slope	Unsuited slope
Walnut, stony	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope low clay depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
MwD:					
Micaville, stony	Poorly suited slope low clay	Poorly suited slope warm aspect	Poorly suited slope low clay	Poorly suited slope	Poorly suited slope
Brownwood, stony	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
MwE:					
Micaville, stony	Poorly suited slope low clay	Poorly suited slope warm aspect	Poorly suited slope low clay	Poorly suited slope	Unsuited slope
Brownwood, stony	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
MwF:					
Micaville, stony	Unsuited slope low clay	Unsuited slope warm aspect	Unsuited slope low clay	Unsuited slope	Unsuited slope
Brownwood, stony	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope low clay depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
NkA:					
Nikwasi, frequently flooded	Unsuited flooding wetness climate-frost	Unsuited flooding wetness phytophthora	Unsuited flooding wetness	Unsuited flooding wetness phytophthora	Unsuited flooding wetness climate-frost
NtD, NtE:					
Northcove, very stony	Unsuited slope large stones climate-frost	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones
Maymead, very stony	Unsuited slope large stones climate-frost	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Poorly suited slope large stones
OwC, OwD, OwE, OwF:					
Oconaluftee, windswept	Unsuited slope climate large stones	Unsuited slope climate large stones	Unsuited slope climate large stones	Unsuited slope climate large stones	Unsuited slope climate large stones
Guyot, windswept	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones
Cataloochee, windswept	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones	Unsuited slope depth to rock climate large stones
Pg:					
Pits, occasionally flooded	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Pt:					
Pits, quarry	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
PwC:					
Porters, stony	Poorly suited climate-frost low clay	Well suited	Suited low clay slope	Suited slope climate-frost	Suited slope climate-frost
Unaka, stony	Unsuited depth to rock low clay	Unsuited depth to rock	Unsuited depth to rock low clay	Unsuited slope depth to rock	Unsuited slope depth to rock
PwD:					
Porters, stony	Poorly suited slope climate-frost low clay	Suited slope	Suited slope low clay	Suited slope climate-frost	Poorly suited slope climate-frost
Unaka, stony	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
PwE:					
Porters, stony	Poorly suited slope climate-frost low clay	Suited slope	Poorly suited slope	Poorly suited slope climate-frost	Unsuited slope climate-frost
Unaka, stony	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
PxF:					
Porters, rocky	Unsuited slope	Unsuited slope	Unsuited slope	Unsuited slope	Unsuited slope
Unaka, rocky	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
RdA:					
Reddies, occasionally flooded	Unsuited flooding droughty climate-frost	Poorly suited flooding droughty low elevation	Poorly suited flooding too sandy	Suited flooding droughty climate-frost	Suited flooding droughty climate-frost
RkF:					
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Cleveland, very bouldery	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
RoF:					
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Oteen, very bouldery	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
RsA:					
Rosman, occasionally flooded	Unsuited flooding climate-frost low clay	Poorly suited flooding low elevation	Poorly suited flooding too sandy	Well suited flooding climate-frost	Well suited flooding climate-frost

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
SoD:					
Soco, stony	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
Stecoah, stony	Poorly suited slope low clay	Poorly suited slope warm aspect	Suited slope low clay	Poorly suited slope	Poorly suited slope
SoE:					
Soco, stony	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
Stecoah, stony	Poorly suited slope low clay	Poorly suited slope warm aspect	Poorly suited slope low clay	Poorly suited slope	Unsuited slope
SoF:					
Soco, stony	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope low clay depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Stecoah, stony	Unsuited slope low clay	Unsuited slope warm aspect	Unsuited slope low clay	Unsuited slope	Unsuited slope
StB:					
Statler, rarely flooded	Poorly suited climate-frost flooding	Poorly suited high clay phytophthora flooding	Poorly suited flooding	Poorly suited surface clay phytophthora flooding climate-frost	Well suited flooding climate-frost
SyD:					
Sylco, stony	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones
Soco, stony	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock
SyE:					
Sylco, stony	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones
Soco, stony	Poorly suited slope depth to rock low clay	Poorly suited slope depth to rock warm aspect	Poorly suited slope low clay depth to rock	Poorly suited slope depth to rock	Unsuited slope depth to rock

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
SzF:					
Sylco, very stony	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope small stones depth to rock	Unsuited slope depth to rock small stones	Unsuited slope depth to rock small stones
Soco, very stony	Unsuited slope depth to rock low clay	Unsuited slope depth to rock warm aspect	Unsuited slope low clay depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
TaB:					
Tate	Suited climate-frost	Suited phytophthora low elevation	Well suited	Poorly suited surface clay phytophthora climate-frost	Well suited climate-frost
TaC:					
Tate	Suited climate-frost slope	Suited phytophthora low elevation	Suited slope	Poorly suited surface clay phytophthora slope climate-frost	Suited slope climate-frost
TaD:					
Tate	Suited slope climate-frost	Suited slope phytophthora low elevation	Suited slope	Poorly suited slope surface clay phytophthora climate-frost	Poorly suited slope climate-frost
TkC:					
Tate, very stony	Suited climate-frost large stones slope	Suited phytophthora large stones	Suited large stones slope	Poorly suited surface clay large stones slope climate-frost	Poorly suited large stones slope climate-frost
TkD:					
Tate, very stony	Suited slope climate-frost large stones	Suited slope phytophthora large stones	Suited slope large stones	Poorly suited slope surface clay large stones climate-frost	Poorly suited slope large stones climate-frost
TmB, TmC, TmD:					
Tate	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Urban land	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
TnE:					
Toecane, extremely bouldery	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones
ToC:					
Toecane, bouldery	Unsuited large stones slope	Unsuited large stones	Unsuited large stones	Unsuited large stones slope	Unsuited slope large stones

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
ToC:					
Tusquitee, bouldery-----	Suited large stones climate-frost slope	Suited large stones	Suited large stones slope	Suited large stones climate-frost	Suited slope large stones climate-frost
TpD, TpE:					
Toecane, very bouldery--	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones
Tusquitee, very bouldery	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones
TsA:					
Toxaway, frequently flooded----------------	Unsuited flooding wetness climate-frost	Unsuited flooding wetness phytophthora	Unsuited flooding wetness	Unsuited flooding wetness phytophthora	Unsuited flooding wetness climate-frost
TtE:					
Trimont, stony----------	Poorly suited slope	Poorly suited slope	Poorly suited slope	Poorly suited slope	Unsuited slope
TuD:					
Tusquitee, stony--------	Suited slope large stones climate-frost	Suited slope large stones	Suited slope large stones	Suited slope large stones climate-frost	Suited slope large stones climate-frost
Toecane, stony----------	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones	Unsuited slope large stones
TwB:					
Tusquitee---------------	Suited climate-frost	Well suited phytophthora	Well suited	Suited phytophthora climate-frost	Well suited climate-frost
Whiteside---------------	Suited climate-frost	Suited phytophthora	Well suited	Poorly suited phytophthora climate-frost	Well suited climate-frost
TwC:					
Tusquitee---------------	Suited climate-frost slope	Well suited phytophthora	Suited slope	Suited phytophthora climate-frost	Suited slope climate-frost
Whiteside---------------	Suited climate-frost slope	Suited phytophthora	Suited slope	Poorly suited phytophthora climate-frost	Suited slope climate-frost
UcB:					
Udifluvents, frequently flooded----------------	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Ud:					
Udorthents, loamy-------	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
UfB, UhE:					
Udorthents, occasionally flooded	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Urban land	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
UkD:					
Unaka, very bouldery	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
UkE:					
Unaka, very bouldery	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
UkF:					
Unaka, very bouldery	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
UnB: Unison	Suited climate-frost	Poorly suited high clay phytophthora	Poorly suited high clay	Poorly suited surface clay phytophthora	Well suited climate-frost
UnC: Unison	Suited climate-frost slope	Poorly suited high clay phytophthora	Poorly suited high clay slope	Poorly suited surface clay phytophthora slope	Suited slope climate-frost
UnD: Unison	Suited slope climate-frost	Poorly suited slope high clay phytophthora	Poorly suited slope high clay	Unsuited slope surface clay phytophthora	Poorly suited slope climate-frost
UrB, UrC:					
Unison	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Urban land	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
Ux:					
Urban land	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
WaC2:					
Walnut, moderately eroded	Poorly suited depth to rock eroded	Poorly suited depth to rock eroded	Poorly suited depth to rock eroded	Poorly suited depth to rock eroded slope	Poorly suited depth to rock eroded slope
Oteen, moderately eroded	Unsuited depth to rock eroded	Unsuited depth to rock eroded	Unsuited depth to rock eroded	Unsuited depth to rock slope	Unsuited depth to rock slope
Mars Hill, moderately eroded	Suited low clay eroded	Poorly suited warm aspect eroded	Suited low clay eroded slope	Poorly suited eroded slope	Poorly suited eroded slope

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
WaD2:					
Walnut, moderately eroded	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock eroded	Poorly suited slope depth to rock eroded
Oteen, moderately eroded	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Mars Hill, moderately eroded	Poorly suited slope low clay eroded	Poorly suited slope warm aspect eroded	Poorly suited slope low clay eroded	Poorly suited slope eroded	Poorly suited slope eroded
WaE2:					
Walnut, moderately eroded	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Oteen, moderately eroded	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Mars Hill, moderately eroded	Poorly suited slope low clay eroded	Poorly suited slope warm aspect eroded	Poorly suited slope low clay eroded	Poorly suited slope eroded	Unsuited slope eroded
WnF:					
Walnut	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Oteen	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock	Unsuited slope depth to rock
Rock outcrop	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
W:					
Water	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited
WoE:					
Wayah, bouldery	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate
Burton, bouldery	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate
WpF:					
Wayah, very rocky	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate

Table 5.—Orchard and Ornamental Crops—Continued

Soil name and map symbol	Apples	Fraser fir[1]	Ball and burlap	Line-out beds[2]	Vegetables[3]
WpF:					
Burton, very rocky	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate
WrC, WrD, WrE:					
Wayah, windswept	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate
Burton, windswept	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate
WsF:					
Wayah, windswept	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate	Unsuited slope climate
Burton, windswept	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate	Unsuited slope depth to rock climate
WtB:					
Whiteside	Suited climate-frost	Suited phytophthora	Well suited	Poorly suited phytophthora climate-frost slope	Well suited climate-frost
WtC:					
Whiteside	Suited climate-frost	Suited phytophthora	Suited slope	Poorly suited phytophthora climate-frost	Suited climate-frost slope
ZcB:					
Zillicoa	Suited high clay	Poorly suited high clay phytophthora low elevation	Poorly suited high clay	Unsuited surface clay phytophthora	Well suited high clay
ZcC:					
Zillicoa	Suited high clay	Poorly suited high clay phytophthora low elevation	Poorly suited high clay	Unsuited phytophthora slope	Suited high clay slope
ZoD:					
Zillicoa, stony	Suited slope high clay	Poorly suited slope high clay phytophthora low elevation	Poorly suited slope high clay	Unsuited slope phytophthora	Poorly suited slope high clay

[1] In general, elevations below 3,000 feet or above 4,600 feet are considered marginal to unsuited for commercial Fraser fir production due to climatic limitations.

[2] In general, elevations above 4,600 feet are considered marginal to unsuited for line-out beds, except for Fraser fir, due to climatic limitations.

[3] Vegetables commonly include tomatoes, squash, bell peppers, sweet corn, cucumbers, pole/bush beans, potatoes, cabbage, greens, strawberries, and melons.

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part I

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
AcD:						
Ashe, very stony	4s	---	---	---	---	---
Cleveland, very stony	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
ArE:						
Ashe, very bouldery	7s	---	---	---	---	---
Cleveland, very bouldery	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
ArF:						
Ashe, very bouldery	7s	---	---	---	---	---
Cleveland, very bouldery	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
BaD:						
Balsam, extremely bouldery	7s	---	---	---	---	---
Tanasee, extremely bouldery	6s	---	---	---	---	---
BaE:						
Balsam, extremely bouldery	7s	---	---	---	---	---
Tanasee, extremely bouldery	7s	---	---	---	---	---
BeA:						
Biltmore, occasionally flooded	3s	---	1.40	1.80	2.00	1.60
BkB2:						
Braddock, moderately eroded	2e	6.00	3.60	4.70	5.20	4.10
BkC2:						
Braddock, moderately eroded	3e	5.50	3.30	4.20	4.70	3.70
BkD2:						
Braddock, moderately eroded	4e	---	2.60	3.40	3.80	3.00
BnB:						
Braddock	2e	---	---	---	---	---
Urban land	8	---	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part I—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
BnC:						
Braddock	3e	---	---	---	---	---
Urban land	8	---	---	---	---	---
BpF:						
Breakneck, windswept	7s	---	---	---	---	---
Pullback, windswept	7s	---	---	---	---	---
BwD:						
Burton, windswept	6s	---	---	---	---	---
Craggey, windswept	7s	---	---	---	---	---
BxE:						
Burton, windswept	7s	---	---	---	---	---
Craggey, windswept	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
BxF:						
Burton, windswept	7s	---	---	---	---	---
Craggey, windswept	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
CaE:						
Cataska, very rocky	7s	---	---	---	---	---
Sylco, very rocky	7s	---	---	---	---	---
CdF:						
Cataska, very stony	7s	---	---	---	---	---
Sylco, very stony	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
ChD:						
Cheoah, stony	4e	---	---	---	---	---
Jeffrey, stony	4e	---	---	---	---	---
ChE:						
Cheoah, stony	6e	---	---	---	---	---
Jeffrey, stony	6e	---	---	---	---	---
ChF:						
Cheoah, stony	7e	---	---	---	---	---
Jeffrey, stony	7e	---	---	---	---	---
CkB2:						
Clifton, moderately eroded	2e	---	4.00	5.10	5.70	4.60

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part I—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
CkC2:						
Clifton, moderately eroded	3e	---	3.40	4.30	4.80	3.80
CkD2:						
Clifton, moderately eroded	4e	---	2.90	3.80	4.20	3.40
CkE2:						
Clifton, moderately eroded	6e	---	2.90	3.80	4.20	3.40
CsB:						
Clifton, stony	2e	---	3.60	4.60	5.10	4.10
CsC:						
Clifton, stony	3e	---	3.40	4.30	4.80	3.80
CsD:						
Clifton, stony	4e	---	2.90	3.80	4.20	3.40
CuB:						
Clifton	2e	---	---	---	---	---
Urban land	8	---	---	---	---	---
CuC:						
Clifton	3e	---	---	---	---	---
Urban land	8	---	---	---	---	---
CuD:						
Clifton	4e	---	---	---	---	---
Urban land	8	---	---	---	---	---
CxE:						
Craggey, windswept	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
Clingman, windswept	7s	---	---	---	---	---
CxF:						
Craggey, windswept	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
Clingman, windswept	7s	---	---	---	---	---
DAM:						
Dam	8s	---	---	---	---	---
DeA:						
Dellwood, occasionally flooded	3s	---	2.70	3.50	3.90	3.10
Reddies, occasionally flooded	2w	4.50	3.50	4.50	5.00	4.00

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part I—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
DrB:						
Dillard, rarely flooded-	2w	4.50	3.80	4.90	5.40	4.30
EdC:						
Edneyville, stony-------	3e	---	2.90	3.70	4.00	3.20
Chestnut, stony---------	3e	---	2.60	3.30	3.60	2.90
EdD:						
Edneyville, stony-------	4e	---	2.50	3.20	3.50	2.80
Chestnut, stony---------	4e	---	2.30	2.90	3.20	2.50
EdE:						
Edneyville, stony-------	6e	---	2.00	2.50	2.80	2.20
Chestnut, stony---------	6e	---	1.80	2.30	2.50	2.00
EdF:						
Edneyville, stony-------	7e	---	---	---	---	---
Chestnut, stony---------	7e	---	---	---	---	---
EvD2:						
Evard, moderately eroded	4e	---	2.50	3.20	3.50	2.80
Cowee, moderately eroded	4e	---	2.30	2.90	3.20	2.50
EvE2:						
Evard, moderately eroded	6e	---	2.00	2.50	2.80	2.20
Cowee, moderately eroded	6e	---	1.80	2.30	2.50	2.00
EvF2:						
Evard, moderately eroded	7e	---	---	---	---	---
Cowee, moderately eroded	7e	---	---	---	---	---
EwC:						
Evard, stony------------	3e	5.50	2.90	3.70	4.00	3.20
Cowee, stony------------	3e	4.50	2.60	3.30	3.60	2.90
EwD:						
Evard, stony------------	4e	---	2.50	3.20	3.50	2.80
Cowee, stony------------	4e	---	2.30	2.90	3.20	2.50
EwE:						
Evard, stony------------	6e	---	2.00	2.50	2.80	2.20
Cowee, stony------------	6e	---	1.80	2.30	2.50	2.00
EwF:						
Evard, stony------------	7e	---	---	---	---	---
Cowee, stony------------	7e	---	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part I—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
ExC:						
Evard-------------------	3e	---	---	---	---	---
Cowee-------------------	3e	---	---	---	---	---
Urban land--------------	8	---	---	---	---	---
ExD:						
Evard-------------------	4e	---	---	---	---	---
Cowee-------------------	4e	---	---	---	---	---
Urban land--------------	8	---	---	---	---	---
ExE:						
Evard-------------------	6e	---	---	---	---	---
Cowee-------------------	6e	---	---	---	---	---
Urban land--------------	8	---	---	---	---	---
FaC2:						
Fannin, moderately eroded-----------------	3e	5.00	1.60	2.10	2.20	1.80
Lauada, moderately eroded-----------------	3e	---	---	---	---	---
FaD2:						
Fannin, moderately eroded-----------------	4e	---	1.40	1.80	2.00	1.60
Lauada, moderately eroded-----------------	4e	---	---	---	---	---
FaE2:						
Fannin, moderately eroded-----------------	6e	---	1.10	1.40	1.50	1.20
Lauada, moderately eroded-----------------	6e	---	---	---	---	---
FnB:						
Fannin, moderately eroded-----------------	2e	---	---	---	---	---
Lauada, moderately eroded-----------------	2e	---	---	---	---	---
Urban land--------------	8	---	---	---	---	---
FnC:						
Fannin, moderately eroded-----------------	3e	---	---	---	---	---
Lauada, moderately eroded-----------------	3e	---	---	---	---	---
Urban land--------------	8	---	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part I—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
FnD:						
Fannin, moderately eroded	4e	---	---	---	---	---
Lauada, moderately eroded	4e	---	---	---	---	---
Urban land	8	---	---	---	---	---
FrA:						
French, occasionally flooded	3w	---	2.80	3.60	4.00	3.20
HcE:						
Heintooga, very stony	7s	---	---	---	---	---
Chiltoskie, very stony	7s	---	---	---	---	---
HpA:						
Hemphill, rarely flooded	4w	---	1.40	1.80	2.00	1.60
IoA:						
Iotla, occasionally flooded	3w	---	3.20	4.10	4.50	3.60
JbB:						
Junaluska	2e	---	2.40	3.00	3.30	2.60
Brasstown	2e	---	2.90	3.70	4.00	3.20
JbC:						
Junaluska	3e	---	2.40	3.00	3.30	2.60
Brasstown	3e	---	2.90	3.70	4.00	3.20
JbD:						
Junaluska	4e	---	2.10	2.60	2.90	2.30
Brasstown	4e	---	2.50	3.20	3.50	2.80
JbE:						
Junaluska	6e	---	1.60	2.10	2.30	1.80
Brasstown	6e	---	2.00	2.50	2.80	2.20
KsB:						
Kanuga	2w	6.00	3.30	4.30	4.80	3.80
Swannanoa	3w	4.50	3.80	4.90	5.40	4.30
KsC:						
Kanuga	3e	5.50	2.80	3.60	4.00	3.20
Swannanoa	3w	5.50	2.80	3.60	4.00	3.20
MvD:						
Mars Hill, stony	4e	---	---	---	---	---
Walnut, stony	4e	---	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part I—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
MvE:						
Mars Hill, stony	6e	---	---	---	---	---
Walnut, stony	6e	---	---	---	---	---
MvF:						
Mars Hill, stony	7e	---	---	---	---	---
Walnut, stony	7e	---	---	---	---	---
MwD:						
Micaville, stony	4e	---	---	---	---	---
Brownwood, stony	4e	---	---	---	---	---
MwE:						
Micaville, stony	6e	---	---	---	---	---
Brownwood, stony	6e	---	---	---	---	---
MwF:						
Micaville, stony	7e	---	---	---	---	---
Brownwood, stony	7e	---	---	---	---	---
NkA:						
Nikwasi, frequently flooded	4w	---	2.10	2.70	3.00	2.40
NtD:						
Northcove, very stony	7s	---	---	---	---	---
Maymead, very stony	4s	---	---	---	---	---
NtE:						
Northcove, very stony	7s	---	---	---	---	---
Maymead, very stony	6s	---	---	---	---	---
OwC:						
Oconaluftee, windswept	4s	---	---	---	---	---
Guyot, windswept	4s	---	---	---	---	---
Cataloochee, windswept	4s	---	---	---	---	---
OwD:						
Oconaluftee, windswept	6s	---	---	---	---	---
Guyot, windswept	6s	---	---	---	---	---
Cataloochee, windswept	6s	---	---	---	---	---
OwE:						
Oconaluftee, windswept	7s	---	---	---	---	---
Guyot, windswept	7s	---	---	---	---	---
Cataloochee, windswept	7s	---	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part I—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
OwF:						
Oconaluftee, windswept--	7s	---	---	---	---	---
Guyot, windswept--------	7s	---	---	---	---	---
Cataloochee, windswept--	7s	---	---	---	---	---
Pg:						
Pits, gravel------------	8s	---	---	---	---	---
Pt:						
Pits, quarry------------	8s	---	---	---	---	---
PwC:						
Porters, stony----------	3e	---	2.20	2.90	3.20	2.60
Unaka, stony------------	3e	---	2.20	2.90	3.20	2.60
PwD:						
Porters, stony----------	4e	---	2.00	2.50	2.80	2.20
Unaka, stony------------	4e	---	2.00	2.50	2.80	2.20
PwE:						
Porters, stony----------	6e	---	2.00	2.50	2.80	2.20
Unaka, stony------------	6e	---	2.00	2.50	2.80	2.20
PxF:						
Porters, rocky----------	7s	---	---	---	---	---
Unaka, rocky------------	7s	---	---	---	---	---
RdA:						
Reddies, occasionally flooded----------------	2w	4.50	3.50	4.50	5.00	4.00
RkF:						
Rock outcrop------------	8s	---	---	---	---	---
Cleveland, very bouldery	7s	---	---	---	---	---
RoF:						
Rock outcrop------------	8s	---	---	---	---	---
Oteen, very bouldery----	7s	---	---	---	---	---
RsA:						
Rosman, occasionally flooded----------------	2w	4.50	3.50	4.50	5.00	4.00
SoD:						
Soco, stony-------------	4e	---	---	---	---	---
Stecoah, stony----------	4e	---	---	---	---	---
SoE:						
Soco, stony-------------	6e	---	---	---	---	---
Stecoah, stony----------	6e	---	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part I—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
SoF:						
Soco, stony	7e	---	---	---	---	---
Stecoah, stony	7e	---	---	---	---	---
StB:						
Statler, rarely flooded	2e	6.50	3.40	4.40	4.90	3.90
SyD:						
Sylco, stony	7s	---	---	---	---	---
Soco, stony	4e	---	---	---	---	---
SyE:						
Sylco, stony	7s	---	---	---	---	---
Soco, stony	6e	---	---	---	---	---
SzF:						
Sylco, very stony	7s	---	---	---	---	---
Soco, very stony	7s	---	---	---	---	---
TaB:						
Tate	2e	6.00	4.00	5.10	5.70	4.60
TaC:						
Tate	3e	5.50	3.40	4.30	4.80	3.80
TaD:						
Tate	4e	---	2.90	3.80	4.20	3.40
TkC:						
Tate, very stony	3s	---	3.40	4.30	4.80	3.80
TkD:						
Tate, very stony	4s	---	2.90	3.80	4.20	3.40
TmB:						
Tate	2e	---	---	---	---	---
Urban land	8	---	---	---	---	---
TmC:						
Tate	3e	---	---	---	---	---
Urban land	8	---	---	---	---	---
TmD:						
Tate	4e	---	---	---	---	---
Urban land	8	---	---	---	---	---
TnE:						
Toecane, extremely bouldery	7s	---	---	---	---	---
ToC:						
Toecane, bouldery	6s	---	3.40	4.30	4.80	3.80
Tusquitee, bouldery	3s	---	3.30	4.20	4.60	3.70

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part I—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
TpD:						
Toecane, very bouldery--	6s	---	2.90	3.80	4.20	3.40
Tusquitee, very bouldery	4s	---	2.90	3.80	4.20	3.40
TpE:						
Toecane, very bouldery--	7s	---	---	---	---	---
Tusquitee, very bouldery	7s	---	---	---	---	---
TsA:						
Toxaway, frequently flooded----------------	4w	---	2.50	3.20	3.50	2.80
TtE:						
Trimont, stony----------	6e	---	---	---	---	---
TuD:						
Tusquitee, stony--------	4e	---	2.90	3.80	4.20	3.40
Toecane, stony----------	7s	---	---	---	---	---
TwB:						
Tusquitee---------------	2e	---	3.90	5.00	5.50	4.40
Whiteside---------------	2w	---	3.70	4.80	5.20	4.20
TwC:						
Tusquitee---------------	3e	---	3.30	4.20	4.60	3.70
Whiteside---------------	3e	---	3.70	4.80	5.20	4.20
UcB:						
Udifluvents, frequently flooded----------------	7w	---	---	---	---	---
Ud:						
Udorthents, loamy-------	7e	---	---	---	---	---
UfB:						
Udorthents, occasionally flooded----------------	7e	---	---	---	---	---
Urban land, occasionally flooded----------------	8	---	---	---	---	---
UhE:						
Udorthents, rocky-------	7s	---	---	---	---	---
Urban land--------------	8	---	---	---	---	---
UkD:						
Unaka, very bouldery----	4s	---	---	---	---	---
Rock outcrop------------	8s	---	---	---	---	---
UkE:						
Unaka, very bouldery----	6s	---	---	---	---	---
Rock outcrop------------	8s	---	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part I—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
UkF:						
Unaka, very bouldery	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
UnB:						
Unison	2e	6.00	3.30	4.30	4.80	3.80
UnC:						
Unison	3e	5.50	2.80	3.60	4.00	3.20
UnD:						
Unison	4e	5.00	2.50	3.20	3.50	2.80
UrB:						
Unison	2e	---	---	---	---	---
Urban land	8	---	---	---	---	---
UrC:						
Unison	3e	---	---	---	---	---
Urban land	8	---	---	---	---	---
Ux:						
Urban land	8s	---	---	---	---	---
W:						
Water	8w	---	---	---	---	---
WaC2:						
Walnut, moderately eroded	3e	---	---	---	---	---
Oteen, moderately eroded	7s	---	---	---	---	---
Mars Hill, moderately eroded	3e	---	---	---	---	---
WaD2:						
Walnut, moderately eroded	4e	---	---	---	---	---
Oteen, moderately eroded	7s	---	---	---	---	---
Mars Hill, moderately eroded	4e	---	---	---	---	---
WaE2:						
Walnut, moderately eroded	6e	---	---	---	---	---
Oteen, moderately eroded	7s	---	---	---	---	---
Mars Hill, moderately eroded	6e	---	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part I—Continued

Map symbol and soil name	Land capability	Alfalfa hay	Cool-season grasses	Orchardgrass hay	Tall fescue hay	Timothy hay
		Tons	Tons	Tons	Tons	Tons
WnF:						
Walnut	7e	---	---	---	---	---
Oteen	7s	---	---	---	---	---
Rock outcrop	8s	---	---	---	---	---
WoE:						
Wayah, bouldery	7s	---	---	---	---	---
Burton, bouldery	7s	---	---	---	---	---
WpF:						
Wayah, very rocky	7s	---	---	---	---	---
Burton, very rocky	7s	---	---	---	---	---
WrC:						
Wayah, windswept	4s	---	---	---	---	---
Burton, windswept	4s	---	---	---	---	---
WrD:						
Wayah, windswept	6s	---	---	---	---	---
Burton, windswept	6s	---	---	---	---	---
WrE:						
Wayah, windswept	7s	---	---	---	---	---
Burton, windswept	7s	---	---	---	---	---
WsF:						
Wayah, windswept	7s	---	---	---	---	---
Burton, windswept	7s	---	---	---	---	---
WtB:						
Whiteside	2w	---	3.70	4.80	5.20	4.20
WtC:						
Whiteside	3e	---	3.10	4.00	4.40	3.50
ZcB:						
Zillicoa	2e	---	---	---	4.30	---
ZcC:						
Zillicoa	3e	---	---	---	3.60	---
ZoD:						
Zillicoa, stony	4e	---	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part II

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Corn	Corn silage	Burley tobacco	Tomatoes
		Bu	Tons	Lbs	Tons
AcD:					
Ashe, very stony	4s	---	---	---	---
Cleveland, very stony	7s	---	---	---	---
Rock outcrop	8s	---	---	---	---
ArE:					
Ashe, very bouldery	7s	---	---	---	---
Cleveland, very bouldery	7s	---	---	---	---
Rock outcrop	8s	---	---	---	---
ArF:					
Ashe, very bouldery	7s	---	---	---	---
Cleveland, very bouldery	7s	---	---	---	---
Rock outcrop	8s	---	---	---	---
BaD:					
Balsam, extremely bouldery	7s	---	---	---	---
Tanasee, extremely bouldery	6s	---	---	---	---
BaE:					
Balsam, extremely bouldery	7s	---	---	---	---
Tanasee, extremely bouldery	7s	---	---	---	---
BeA:					
Biltmore, occasionally flooded	3s	75.00	11.90	1,000.00	26.00
BkB2:					
Braddock, moderately eroded	2e	99.00	16.00	2,413.00	18.00
BkC2:					
Braddock, moderately eroded	3e	89.00	14.00	2,173.00	---
BkD2:					
Braddock, moderately eroded	4e	73.00	11.00	1,767.00	---
BnB:					
Braddock	2e	---	---	---	---
Urban land	8	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part II—Continued

Map symbol and soil name	Land capability	Corn	Corn silage	Burley tobacco	Tomatoes
		Bu	Tons	Lbs	Tons
BnC:					
Braddock----------------	3e	---	---	---	---
Urban land--------------	8	---	---	---	---
BpF:					
Breakneck, windswept----	7s	---	---	---	---
Pullback, windswept-----	7s	---	---	---	---
BwD:					
Burton, windswept-------	6s	---	---	---	---
Craggey, windswept------	7s	---	---	---	---
BxE:					
Burton, windswept-------	7s	---	---	---	---
Craggey, windswept------	7s	---	---	---	---
Rock outcrop------------	8s	---	---	---	---
BxF:					
Burton, windswept-------	7s	---	---	---	---
Craggey, windswept------	7s	---	---	---	---
Rock outcrop------------	8s	---	---	---	---
CaE:					
Cataska, very rocky-----	7s	---	---	---	---
Sylco, very rocky-------	7s	---	---	---	---
CdF:					
Cataska, very stony-----	7s	---	---	---	---
Sylco, very stony-------	7s	---	---	---	---
Rock outcrop------------	8s	---	---	---	---
ChD:					
Cheoah, stony-----------	4e	---	---	---	---
Jeffrey, stony----------	4e	---	---	---	---
ChE:					
Cheoah, stony-----------	6e	---	---	---	---
Jeffrey, stony----------	6e	---	---	---	---
ChF:					
Cheoah, stony-----------	7e	---	---	---	---
Jeffrey, stony----------	7e	---	---	---	---
CkB2:					
Clifton, moderately eroded-----------------	2e	109.00	17.10	2,660.00	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part II—Continued

Map symbol and soil name	Land capability	Corn	Corn silage	Burley tobacco	Tomatoes
		Bu	Tons	Lbs	Tons
CkC2:					
Clifton, moderately eroded	3e	92.00	14.40	2,240.00	---
CkD2:					
Clifton, moderately eroded	4e	81.00	12.60	1,960.00	---
CkE2:					
Clifton, moderately eroded	6e	---	---	---	---
CsB:					
Clifton, stony	2e	107.00	17.10	2,584.00	---
CsC:					
Clifton, stony	3e	92.00	14.40	2,240.00	---
CsD:					
Clifton, stony	4e	81.00	12.60	1,960.00	---
CuB:					
Clifton	2e	---	---	---	---
Urban land	8	---	---	---	---
CuC:					
Clifton	3e	---	---	---	---
Urban land	8	---	---	---	---
CuD:					
Clifton	4e	---	---	---	---
Urban land	8	---	---	---	---
CxE:					
Craggey, windswept	7s	---	---	---	---
Rock outcrop	8s	---	---	---	---
Clingman, windswept	7s	---	---	---	---
CxF:					
Craggey, windswept	7s	---	---	---	---
Rock outcrop	8s	---	---	---	---
Clingman, windswept	7s	---	---	---	---
DAM:					
Dam	8s	---	---	---	---
DeA:					
Dellwood, occasionally flooded	3s	98.00	16.00	1,766.00	22.00
Reddies, occasionally flooded	2w	203.00	32.00	2,576.00	26.00

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part II—Continued

Map symbol and soil name	Land capability	Corn	Corn silage	Burley tobacco	Tomatoes
		Bu	Tons	Lbs	Tons
DrB:					
Dillard, rarely flooded-	2w	171.00	27.00	2,538.00	28.00
EdC:					
Edneyville, stony-------	3e	---	---	2,322.00	---
Chestnut, stony---------	3e	---	---	2,078.00	---
EdD:					
Edneyville, stony-------	4e	---	---	---	---
Chestnut, stony---------	4e	---	---	---	---
EdE:					
Edneyville, stony-------	6e	---	---	---	---
Chestnut, stony---------	6e	---	---	---	---
EdF:					
Edneyville, stony-------	7e	---	---	---	---
Chestnut, stony---------	7e	---	---	---	---
EvD2:					
Evard, moderately eroded	4e	86.00	14.00	2,041.00	---
Cowee, moderately eroded	4e	77.00	13.00	1,837.00	---
EvE2:					
Evard, moderately eroded	6e	---	---	---	---
Cowee, moderately eroded	6e	---	---	---	---
EvF2:					
Evard, moderately eroded	7e	---	---	---	---
Cowee, moderately eroded	7e	---	---	---	---
EwC:					
Evard, stony------------	3e	98.00	16.00	2,322.00	---
Cowee, stony------------	3e	88.00	14.00	2,090.00	---
EwD:					
Evard, stony------------	4e	86.00	14.00	2,041.00	---
Cowee, stony------------	4e	77.00	13.00	1,837.00	---
EwE:					
Evard, stony------------	6e	---	---	---	---
Cowee, stony------------	6e	---	---	---	---
EwF:					
Evard, stony------------	7e	---	---	---	---
Cowee, stony------------	7e	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part II—Continued

Map symbol and soil name	Land capability	Corn	Corn silage	Burley tobacco	Tomatoes
		Bu	Tons	Lbs	Tons
ExC:					
Evard	3e	---	---	---	---
Cowee	3e	---	---	---	---
Urban land	8	---	---	---	---
ExD:					
Evard	4e	---	---	---	---
Cowee	4e	---	---	---	---
Urban land	8	---	---	---	---
ExE:					
Evard	6e	---	---	---	---
Cowee	6e	---	---	---	---
Urban land	8	---	---	---	---
FaC2:					
Fannin, moderately eroded	3e	54.00	11.00	1,429.00	---
Lauada, moderately eroded	3e	---	---	---	---
FaD2:					
Fannin, moderately eroded	4e	47.00	9.00	1,256.00	---
Lauada, moderately eroded	4e	---	---	---	---
FaE2:					
Fannin, moderately eroded	6e	---	---	---	---
Lauada, moderately eroded	6e	---	---	---	---
FnB:					
Fannin, moderately eroded	2e	---	---	---	---
Lauada, moderately eroded	2e	---	---	---	---
Urban land	8	---	---	---	---
FnC:					
Fannin, moderately eroded	3e	---	---	---	---
Lauada, moderately eroded	3e	---	---	---	---
Urban land	8	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part II—Continued

Map symbol and soil name	Land capability	Corn	Corn silage	Burley tobacco	Tomatoes
		Bu	Tons	Lbs	Tons
FnD:					
Fannin, moderately eroded	4e	---	---	---	---
Lauada, moderately eroded	4e	---	---	---	---
Urban land	8	---	---	---	---
FrA:					
French, occasionally flooded	3w	155.00	24.00	2,200.00	---
HcE:					
Heintooga, very stony	7s	---	---	---	---
Chiltoskie, very stony	7s	---	---	---	---
HpA:					
Hemphill, rarely flooded	4w	105.00	16.00	1,000.00	26.00
IoA:					
Iotla, occasionally flooded	3w	155.00	24.00	2,200.00	---
JbB:					
Junaluska	2e	62.00	9.80	1,245.00	---
Brasstown	2e	76.00	12.00	1,518.00	---
JbC:					
Junaluska	3e	62.00	9.80	1,245.00	---
Brasstown	3e	76.00	12.00	1,518.00	---
JbD:					
Junaluska	4e	55.00	8.20	1,095.00	---
Brasstown	4e	---	---	---	---
JbE:					
Junaluska	6e	---	---	---	---
Brasstown	6e	---	---	---	---
KsB:					
Kanuga	2w	141.00	24.00	2,420.00	---
Swannanoa	3w	158.00	26.00	2,220.00	---
KsC:					
Kanuga	3e	118.00	21.50	2,100.00	---
Swannanoa	3w	131.00	23.00	1,950.00	---
MvD:					
Mars Hill, stony	4e	---	---	---	---
Walnut, stony	4e	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part II—Continued

Map symbol and soil name	Land capability	Corn	Corn silage	Burley tobacco	Tomatoes
		Bu	Tons	Lbs	Tons
MvE:					
Mars Hill, stony--------	6e	---	---	---	---
Walnut, stony-----------	6e	---	---	---	---
MvF:					
Mars Hill, stony--------	7e	---	---	---	---
Walnut, stony-----------	7e	---	---	---	---
MwD:					
Micaville, stony--------	4e	---	---	---	---
Brownwood, stony--------	4e	---	---	---	---
MwE:					
Micaville, stony--------	6e	---	---	---	---
Brownwood, stony--------	6e	---	---	---	---
MwF:					
Micaville, stony--------	7e	---	---	---	---
Brownwood, stony--------	7e	---	---	---	---
NkA:					
Nikwasi, frequently flooded---------------	4w	---	---	---	---
NtD:					
Northcove, very stony---	7s	---	---	---	---
Maymead, very stony-----	4s	---	---	---	---
NtE:					
Northcove, very stony---	7s	---	---	---	---
Maymead, very stony-----	6s	---	---	---	---
OwC:					
Oconaluftee, windswept--	4s	---	---	---	---
Guyot, windswept--------	4s	---	---	---	---
Cataloochee, windswept--	4s	---	---	---	---
OwD:					
Oconaluftee, windswept--	6s	---	---	---	---
Guyot, windswept--------	6s	---	---	---	---
Cataloochee, windswept--	6s	---	---	---	---
OwE:					
Oconaluftee, windswept--	7s	---	---	---	---
Guyot, windswept--------	7s	---	---	---	---
Cataloochee, windswept--	7s	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part II—Continued

Map symbol and soil name	Land capability	Corn	Corn silage	Burley tobacco	Tomatoes
		Bu	Tons	Lbs	Tons
OwF:					
Oconaluftee, windswept--	7s	---	---	---	---
Guyot, windswept--------	7s	---	---	---	---
Cataloochee, windswept--	7s	---	---	---	---
Pg:					
Pits, gravel------------	8s	---	---	---	---
Pt:					
Pits, quarry------------	8s	---	---	---	---
PwC:					
Porters, stony----------	3e	96.00	19.20	1,280.00	---
Unaka, stony------------	3e	96.00	19.20	1,280.00	---
PwD:					
Porters, stony----------	4e	84.00	16.80	1,120.00	---
Unaka, stony------------	4e	84.00	16.80	1,120.00	---
PwE:					
Porters, stony----------	6e	---	---	---	---
Unaka, stony------------	6e	---	---	---	---
PxF:					
Porters, rocky----------	7s	---	---	---	---
Unaka, rocky------------	7s	---	---	---	---
RdA:					
Reddies, occasionally flooded----------------	2w	205.00	32.00	2,600.00	26.00
RkF:					
Rock outcrop------------	8s	---	---	---	---
Cleveland, very bouldery	7s	---	---	---	---
RoF:					
Rock outcrop------------	8s	---	---	---	---
Oteen, very bouldery----	7s	---	---	---	---
RsA:					
Rosman, occasionally flooded----------------	2w	204.00	32.00	2,600.00	30.00
SoD:					
Soco, stony-------------	4e	---	---	---	---
Stecoah, stony----------	4e	---	---	---	---
SoE:					
Soco, stony-------------	6e	---	---	---	---
Stecoah, stony----------	6e	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part II—Continued

Map symbol and soil name	Land capability	Corn	Corn silage	Burley tobacco	Tomatoes
		Bu	Tons	Lbs	Tons
SoF:					
Soco, stony	7e	---	---	---	---
Stecoah, stony	7e	---	---	---	---
StB:					
Statler, rarely flooded	2e	200.00	31.00	2,733.00	30.00
SyD:					
Sylco, stony	7s	---	---	---	---
Soco, stony	4e	---	---	---	---
SyE:					
Sylco, stony	7s	---	---	---	---
Soco, stony	6e	---	---	---	---
SzF:					
Sylco, very stony	7s	---	---	---	---
Soco, very stony	7s	---	---	---	---
TaB:					
Tate	2e	133.00	23.80	2,280.00	26.00
TaC:					
Tate	3e	112.00	20.00	1,920.00	---
TaD:					
Tate	4e	98.00	17.50	1,680.00	---
TkC:					
Tate, very stony	3s	---	---	---	---
TkD:					
Tate, very stony	4s	---	---	---	---
TmB:					
Tate	2e	---	---	---	---
Urban land	8	---	---	---	---
TmC:					
Tate	3e	---	---	---	---
Urban land	8	---	---	---	---
TmD:					
Tate	4e	---	---	---	---
Urban land	8	---	---	---	---
TnE:					
Toecane, extremely bouldery	7s	---	---	---	---
ToC:					
Toecane, bouldery	6s	---	---	---	---
Tusquitee, bouldery	3s	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part II—Continued

Map symbol and soil name	Land capability	Corn	Corn silage	Burley tobacco	Tomatoes
		Bu	Tons	Lbs	Tons
TpD:					
Toecane, very bouldery--	6s	---	---	---	---
Tusquitee, very bouldery	4s	---	---	---	---
TpE:					
Toecane, very bouldery--	7s	---	---	---	---
Tusquitee, very bouldery	7s	---	---	---	---
TsA:					
Toxaway, frequently flooded----------------	4w	175.00	28.00	1,800.00	---
TtE:					
Trimont, stony----------	6e	---	---	---	---
TuD:					
Tusquitee, stony--------	4e	112.00	19.60	1,680.00	---
Toecane, stony----------	7s	---	---	---	---
TwB:					
Tusquitee---------------	2e	158.00	26.60	2,345.00	---
Whiteside---------------	2w	166.00	26.60	2,470.00	---
TwC:					
Tusquitee---------------	3e	133.00	22.40	1,986.00	---
Whiteside---------------	3e	166.00	26.60	2,470.00	---
UcB:					
Udifluvents, frequently flooded----------------	7w	---	---	---	---
Ud:					
Udorthents, loamy-------	7e	---	---	---	---
UfB:					
Udorthents, occasionally flooded----------------	7e	---	---	---	---
Urban land, occasionally flooded----------------	8	---	---	---	---
UhE:					
Udorthents, rocky-------	7s	---	---	---	---
Urban land--------------	8	---	---	---	---
UkD:					
Unaka, very bouldery----	4s	---	---	---	---
Rock outcrop------------	8s	---	---	---	---
UkE:					
Unaka, very bouldery----	6s	---	---	---	---
Rock outcrop------------	8s	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part II—Continued

Map symbol and soil name	Land capability	Corn	Corn silage	Burley tobacco	Tomatoes
		Bu	Tons	Lbs	Tons
UkF:					
Unaka, very bouldery----	7s	---	---	---	---
Rock outcrop------------	8s	---	---	---	---
UnB:					
Unison------------------	2e	128.00	23.80	2,660.00	---
UnC:					
Unison------------------	3e	108.00	20.00	2,240.00	---
UnD:					
Unison------------------	4e	95.00	17.50	1,960.00	---
UrB:					
Unison------------------	2e	---	---	---	---
Urban land--------------	8	---	---	---	---
UrC:					
Unison------------------	3e	---	---	---	---
Urban land--------------	8	---	---	---	---
Ux:					
Urban land--------------	8s	---	---	---	---
W:					
Water-------------------	8w	---	---	---	---
WaC2:					
Walnut, moderately eroded-----------------	3e	---	---	---	---
Oteen, moderately eroded	7s	---	---	---	---
Mars Hill, moderately eroded-----------------	3e	---	---	---	---
WaD2:					
Walnut, moderately eroded-----------------	4e	---	---	---	---
Oteen, moderately eroded	7s	---	---	---	---
Mars Hill, moderately eroded-----------------	4e	---	---	---	---
WaE2:					
Walnut, moderately eroded-----------------	6e	---	---	---	---
Oteen, moderately eroded	7s	---	---	---	---
Mars Hill, moderately eroded-----------------	6e	---	---	---	---

Table 6.—Land Capability and Yields per Acre by Map Unit Component, Part II—Continued

Map symbol and soil name	Land capability	Corn	Corn silage	Burley tobacco	Tomatoes
		Bu	Tons	Lbs	Tons
WnF:					
Walnut------------------	7e	---	---	---	---
Oteen-------------------	7s	---	---	---	---
Rock outcrop------------	8s	---	---	---	---
WoE:					
Wayah, bouldery---------	7s	---	---	---	---
Burton, bouldery--------	7s	---	---	---	---
WpF:					
Wayah, very rocky-------	7s	---	---	---	---
Burton, very rocky------	7s	---	---	---	---
WrC:					
Wayah, windswept--------	4s	---	---	---	---
Burton, windswept-------	4s	---	---	---	---
WrD:					
Wayah, windswept--------	6s	---	---	---	---
Burton, windswept-------	6s	---	---	---	---
WrE:					
Wayah, windswept--------	7s	---	---	---	---
Burton, windswept-------	7s	---	---	---	---
WsF:					
Wayah, windswept--------	7s	---	---	---	---
Burton, windswept-------	7s	---	---	---	---
WtB:					
Whiteside---------------	2w	166.00	26.60	2,470.00	---
WtC:					
Whiteside---------------	3e	140.00	22.40	2,080.00	---
ZcB:					
Zillicoa----------------	2e	100.00	18.10	---	---
ZcC:					
Zillicoa----------------	3e	84.00	15.20	---	---
ZoD:					
Zillicoa, stony---------	4e	---	---	---	---

Table 7.—Prime and Other Important Farmland

(Only the soils considered prime or important farmland are listed. Urban or built-up areas listed are not considered prime or important farmland. If a soil is prime or importan only under certain conditions, the conditions are specified in the "Farmland classific

Map symbol	Map unit name	Farmland cl
BkB2	Braddock clay loam, 2 to 8 percent slopes, moderately eroded	All areas are prime
CkB2	Clifton clay loam, 2 to 8 percent slopes, moderately eroded	All areas are prime
CsB	Clifton sandy loam, 2 to 8 percent slopes	All areas are prime
DrB	Dillard loam, 1 to 5 percent slopes, rarely flooded	All areas are prime
KsB	Kanuga-Swannanoa complex, 2 to 8 percent slopes	All areas are prime
RdA	Reddies sandy loam, 0 to 3 percent slopes, occasionally flooded	All areas are prime
RsA	Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded	All areas are prime
StB	Statler loam, 1 to 5 percent slopes, rarely flooded	All areas are prime
TaB	Tate loam, 2 to 8 percent slopes	All areas are prime
TwB	Tusquitee-Whiteside complex, 2 to 8 percent slopes	All areas are prime
UnB	Unison loam, 2 to 8 percent slopes	All areas are prime
WtB	Whiteside loam, 2 to 8 percent slopes	All areas are prime
ZcB	Zillicoa loam, 2 to 8 percent slopes	All areas are prime
BkD2	Braddock clay loam, 15 to 30 percent slopes, moderately eroded	Farmland of local im
CkD2	Clifton clay loam, 15 to 30 percent slopes, moderately eroded	Farmland of local im
CsD	Clifton sandy loam, 15 to 30 percent slopes	Farmland of local im
EdC	Edneyville-Chestnut complex, 8 to 15 percent slopes, stony	Farmland of local im
EdD	Edneyville-Chestnut complex, 15 to 30 percent slopes, stony	Farmland of local im
EvD2	Evard-Cowee complex, 15 to 30 percent slopes, moderately eroded	Farmland of local im
EwC	Evard-Cowee complex, 8 to 15 percent slopes, stony	Farmland of local im
EwD	Evard-Cowee complex, 15 to 30 percent slopes, stony	Farmland of local im
FaD2	Fannin-Lauada complex, 15 to 30 percent slopes, moderately eroded	Farmland of local im
JbD	Junaluska-Brasstown complex, 15 to 30 percent slopes	Farmland of local im
MvD	Mars Hill-Walnut complex, 15 to 30 percent slopes, stony	Farmland of local im
NtD	Northcove-Maymead complex, 15 to 30 percent slopes, very stony	Farmland of local im
PwC	Porters-Unaka complex, 8 to 15 percent slopes, stony	Farmland of local im
PwD	Porters-Unaka complex, 15 to 30 percent slopes, stony	Farmland of local im
SoD	Soco-Stecoah complex, 15 to 30 percent slopes, stony	Farmland of local im
SyD	Sylco-Soco complex, 15 to 30 percent slopes, stony	Farmland of local im
TaD	Tate loam, 15 to 30 percent slopes	Farmland of local im
TkC	Tate loam, 8 to 15 percent slopes, very stony	Farmland of local im
TkD	Tate loam, 15 to 30 percent slopes, very stony	Farmland of local im
TuD	Tusquitee-Toecane complex, 15 to 30 percent slopes, stony	Farmland of local im
UnD	Unison loam, 15 to 30 percent slopes	Farmland of local im

Table 7.—Prime and Other Important Farmland—Continued

Map symbol	Map unit name	Farmlanc
WaD2	Walnut-Oteen-Mars Hill complex, 15 to 30 percent slopes, moderately eroded	Farmland of local
ZoD	Zillicoa loam, 15 to 30 percent slopes, stony	Farmland of local
BkC2	Braddock clay loam, 8 to 15 percent slopes, moderately eroded	Farmland of state
CkC2	Clifton clay loam, 8 to 15 percent slopes, moderately eroded	Farmland of state
CsC	Clifton sandy loam, 8 to 15 percent slopes	Farmland of state
DeA	Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded	Farmland of state
FaC2	Fannin-Lauada complex, 8 to 15 percent slopes, moderately eroded	Farmland of state
HpA	Hemphill loam, 0 to 3 percent slopes, rarely flooded	Farmland of state
JbB	Junaluska-Brasstown complex, 2 to 8 percent slopes	Farmland of state
JbC	Junaluska-Brasstown complex, 8 to 15 percent slopes	Farmland of state
KsC	Kanuga-Swannanoa complex, 8 to 15 percent slopes	Farmland of state
TaC	Tate loam, 8 to 15 percent slopes	Farmland of state
TwC	Tusquitee-Whiteside complex, 8 to 15 percent slopes	Farmland of state
UnC	Unison loam, 8 to 15 percent slopes	Farmland of state
WaC2	Walnut-Oteen-Mars Hill complex, 8 to 15 percent slopes, moderately eroded	Farmland of state
WtC	Whiteside loam, 8 to 15 percent slopes	Farmland of state
ZcC	Zillicoa loam, 8 to 15 percent slopes	Farmland of state
FrA	French loam, 0 to 3 percent slopes, occasionally flooded	Prime farmland if
IoA	Iotla loam, 0 to 2 percent slopes, occasionally flooded	Prime farmland if
NkA	Nikwasi loam, 0 to 2 percent slopes, frequently flooded	Prime farmland if protected from f frequently flooc growing season
TsA	Toxaway loam, 0 to 2 percent slopes, frequently flooded	Prime farmland if protected from f frequently flooc growing season
BeA	Biltmore loamy sand, 0 to 3 percent slopes, occasionally flooded	Prime farmland if

Table 8.—Hydric Soils

(This report lists only those map unit components that are rated as hydric. Definitions of hydric criteria codes are included at the end of the report)

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
BeA: Biltmore loamy sand, 0 to 3 percent slopes, occasionally flooded	Toxaway, undrained	5	Depressions, flood plains	Yes	2B3
DeA: Dellwood-Reddies complex, 0 to 3 percent slopes, occasionally flooded	Ela, undrained	5	Depressions, flood plains	Yes	2B3
DrB: Dillard loam, 1 to 5 percent slopes, rarely flooded	Hemphill, undrained	5	Depressions, stream terraces	Yes	2B3
FrA: French loam, 0 to 3 percent slopes, occasionally flooded	Ela, undrained	5	Depressions, flood plains	Yes	2B3
HpA: Hemphill loam, 0 to 3 percent slopes, rarely flooded	Hemphill, rarely flooded	75	Depressions, stream terraces	Yes	2B3
	Hemphill, undrained	5	Depressions, stream terraces	Yes	2B3
IoA: Iotla loam, 0 to 2 percent slopes, occasionally flooded	Toxaway, undrained	10	Depressions, flood plains	Yes	2B3
KsB: Kanuga-Swannanoa complex, 2 to 8 percent slopes	Hemphill, drained	5	Depressions, stream terraces	Yes	2B3
NkA: Nikwasi loam, 0 to 2 percent slopes, frequently flooded	Nikwasi, frequently flooded	70	Depressions, flood plains	Yes	2B3
	Nikwasi, undrained	10	Depressions, flood plains	Yes	2B3
RdA: Reddies sandy loam, 0 to 3 percent slopes, occasionally flooded	Ela, undrained	5	Depressions, flood plains	Yes	2B3
RsA: Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded	Toxaway, undrained	5	Depressions, flood plains	Yes	2B3
StB: Statler loam, 1 to 5 percent slopes, rarely flooded	Hemphill, undrained	5	Depressions, stream terraces	Yes	2B3
ToC: Toecane-Tusquitee complex, 8 to 15 percent slopes, bouldery	Cruso, undrained	2	Coves	Yes	2B3

Table 8.—Hydric Soils—Continued

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
TsA:					
Toxaway loam, 0 to 2 percent slopes, frequently flooded	Toxaway, frequently flooded	80	Depressions, flood plains	Yes	2B3
	Toxaway, undrained	10	Depressions, flood plains	Yes	2B3
TwB:					
Tusquitee-Whiteside complex, 2 to 8 percent slopes	Sylva, undrained	5	Depressions, drainageways	Yes	2B3
TwC:					
Tusquitee-Whiteside complex, 8 to 15 percent slopes	Sylva, undrained	5	Depressions, drainageways	Yes	2B3
UcB:					
Udifluvents, sandy, 0 to 5 percent slopes, frequently flooded	Aquents	5	Depressions, flood plains	Yes	2B3
WtB:					
Whiteside loam, 2 to 8 percent slopes	Sylva, undrained	5	Coves, depressions, drainageways	Yes	2B3
WtC:					
Whiteside loam, 8 to 15 percent slopes	Sylva, undrained	5	Depressions, drainageways	Yes	2B3

Explanation of hydric criteria codes:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   - A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
   - B. are poorly drained or very poorly drained and have either:
     - 1.) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
     - 2.) a water table at a depth of 0.5 foot or less during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
     - 3.) a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for long or very long duration during the growing season.
4. Soils that are frequently flooded for long or very long duration during the growing season.

Table 9.—Woodland Management and Productivity

(Please refer to the "Detailed Soil Map Units" section and the "Woodland Management and Productivity" sec survey for information on soil properties and management concerns. Forestland managers should seek from a professional forester)

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index[1]	Volume
								cu ft/
AcD:								
Ashe, very stony	---	---	---	---	---	chestnut oak	70	52.00
						eastern white pine	81	146.00
						hickory	---	---
						Virginia pine	---	---
						pitch pine	---	---
						scarlet oak	---	---
Cleveland, very stony	---	---	---	---	---	chestnut oak	---	---
						eastern white pine	---	---
						scarlet oak	---	---
						white oak	---	---
						black oak	---	---
						shortleaf pine	---	---
						pitch pine	---	---
Rock outcrop.								
ArE, ArF:								
Ashe, very bouldery	---	---	---	---	---	chestnut oak	70	52.00
						eastern white pine	81	146.00
						hickory	---	---
						Virginia pine	---	---
						pitch pine	---	---
						scarlet oak	---	---
Cleveland, very bouldery	---	---	---	---	---	chestnut oak	---	---
						eastern white pine	---	---
						scarlet oak	---	---
						white oak	---	---
						black oak	---	---
						shortleaf pine	---	---
						pitch pine	---	---
Rock outcrop.								

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
BaD, BaE:								
Balsam, extremely bouldery	---	---	---	---	---	red spruce	64	143.00
						Fraser fir	---	---
						northern red oak	---	---
						yellow birch	---	---
						sugar maple	---	---
Tanasee, extremely bouldery	---	---	---	---	---	red spruce	64	150.00
						Fraser fir	---	---
						northern red oak	---	---
						black cherry	---	---
						black oak	---	---
						American beech	---	---
						yellow birch	---	---
						sugar maple	---	---
						eastern hemlock	---	---
						yellow buckeye	---	---
						white ash	---	---
BeA:								
Biltmore, occasionally flooded	Slight	Slight	Severe	Slight	Moderate	yellow-poplar	106	117.00
						eastern white pine	---	---
						American sycamore	---	---
						white ash	---	---
						river birch	---	---
BkB2, BkC2:								
Braddock, moderately eroded	Moderate	Moderate	Moderate	Slight	Moderate	eastern white pine	95	176.00
						northern red oak	80	62.00
						yellow-poplar	90	90.00
BkD2:								
Braddock, moderately eroded	Moderate	Moderate	Moderate	Slight	Moderate	eastern white pine	85	155.00
						northern red oak	70	52.00
						yellow-poplar	80	71.00
BnB, BnC								
Braddock	---	---	---	---	---	---	---	---
Urban land.								

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
BpF:								
Breakneck, windswept----	---	---	---	---	---	American beech------	---	---
						black cherry--------	---	---
						eastern hemlock-----	---	---
						northern red oak----	---	---
						yellow birch--------	---	---
Pullback, windswept-----	---	---	---	---	---	American beech------	---	---
						black cherry--------	---	---
						eastern hemlock-----	---	---
						northern red oak----	---	---
						yellow birch--------	---	---
						yellow buckeye------	---	---
BwD:								
Burton, windswept-------	---	---	---	---	---	northern red oak----	---	---
						red spruce----------	---	---
						Fraser fir----------	---	---
Craggey, windswept------	---	---	---	---	---	northern red oak----	---	---
						red spruce----------	---	---
						Fraser fir----------	---	---
BxE, BxF:								
Burton, windswept-------	---	---	---	---	---	northern red oak----	---	---
						red spruce----------	---	---
						Fraser fir----------	---	---
Craggey, windswept------	---	---	---	---	---	northern red oak----	---	---
						red spruce----------	---	---
						Fraser fir----------	---	---
Rock outcrop.								
CaE:								
Cataska, very rocky-----	---	---	---	---	---	chestnut oak--------	---	---
						pitch pine----------	---	---
						Virginia pine-------	---	---
Sylco, very rocky-------	---	---	---	---	---	scarlet oak---------	64	47.00
						shortleaf pine------	---	---
						pitch pine----------	---	---
						Virginia pine-------	---	---
						chestnut oak--------	---	---
						black oak-----------	63	46.00

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index[1]	Volume
								cu ft/
CdF:								
Cataska, very stony-----	---	---	---	---	---	chestnut oak--------	---	---
						pitch pine----------	---	---
						Virginia pine-------	---	---
Sylco, very stony-------	---	---	---	---	---	scarlet oak---------	64	47.00
						shortleaf pine------	---	---
						pitch pine----------	---	---
						Virginia pine-------	---	---
						chestnut oak--------	---	---
						black oak-----------	63	46.00
Rock outcrop.								
ChD:								
Cheoah, stony-----------	Moderate	Moderate	Slight	Slight	Moderate	northern red oak----	84	66.00
						yellow-poplar-------	103	112.00
						American beech------	80	---
						black cherry--------	74	---
						eastern hemlock-----	---	---
						black oak-----------	---	---
						yellow birch--------	---	---
						sugar maple---------	---	---
						red maple-----------	---	---
						yellow buckeye------	---	---
Jeffrey, stony----------	Moderate	Moderate	Slight	Moderate	Moderate	eastern white pine--	70	114.00
						northern red oak----	60	43.00
						yellow-poplar-------	80	72.00
ChE,ChF								
Cheoah, stony-----------	Severe	Severe	Slight	Slight	Moderate	northern red oak----	84	66.00
						yellow-poplar-------	103	112.00
						American beech------	80	---
						black cherry--------	74	---
						eastern hemlock-----	---	---
						black oak-----------	---	---
						yellow birch--------	---	---
						sugar maple---------	---	---
						red maple-----------	---	---
						yellow buckeye------	---	---
Jeffrey, stony----------	Severe	Severe	Slight	Moderate	Moderate	eastern white pine--	70	114.00
						northern red oak----	60	43.00
						yellow-poplar-------	80	72.00

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
CkB2, CkC2: Clifton, moderately eroded	Moderate	Moderate	Moderate	Slight	Moderate	eastern white pine	95	172.00
						yellow poplar	---	---
						scarlet oak	---	---
						pitch pine	---	---
						shortleaf pine	---	---
CkD2: Clifton, moderately eroded	Moderate	Moderate	Moderate	Slight	Moderate	eastern white pine	95	172.00
						yellow-poplar	---	---
						scarlet oak	---	---
						Virginia pine	---	---
						pitch pine	---	---
CtE2: Clifton, moderately eroded	Severe	Severe	Moderate	Slight	Moderate	eastern white pine	95	172.00
						yellow-poplar	---	---
						scarlet oak	---	---
						Virginia pine	---	---
						pitch pine	---	---
CsB, CsC: Clifton	Slight	Moderate	Slight	Slight	Moderate	eastern white pine	95	172.00
						yellow poplar	---	---
						scarlet oak	---	---
						pitch pine	---	---
						shortleaf pine	---	---
CsD: Clifton	Moderate	Moderate	Slight	Slight	Moderate	eastern white pine	95	172.00
						yellow-poplar	---	---
						scarlet oak	---	---
						Virginia pine	---	---
						pitch pine	---	---
CuB, CuC, CuD: Clifton	---	---	---	---	---	---	---	---
Urban land.								
CxE, CxF: Craggey, windswept	---	---	---	---	---	northern red oak	---	---
						red spruce	---	---
						Fraser fir	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
CxE, CxF:								
Rock outcrop.								
Clingman, windswept	---	---	---	---	---	northern red oak	---	---
						red spruce	---	---
						Fraser fir	---	---
						yellow birch	---	---
DAM.								
Dam								
DeA:								
Dellwood, occasionally flooded	Slight	Slight	Moderate	Slight	Moderate	yellow-poplar	100	107.00
						eastern white pine	91	168.00
						red maple	---	---
						river birch	---	---
						American sycamore	---	---
						eastern hemlock	---	---
Reddies, occasionally flooded	Slight	Slight	Slight	Slight	Severe	yellow-poplar	105	115.00
						American sycamore	---	---
						red maple	---	---
						eastern white pine	---	---
						river birch	---	---
DrB:								
Dillard, rarely flooded	Slight	Slight	Slight	Slight	Moderate	eastern white pine	90	166.00
						shortleaf pine	75	120.00
						Virginia pine	80	112.00
						yellow-poplar	95	98.00
						chestnut oak	---	---
						black oak	---	---
EdC:								
Edneyville, stony	Slight	Slight	Slight	Slight	Moderate	northern red oak	80	62.00
						shortleaf pine	64	97.00
						Virginia pine	66	102.00
						eastern white pine	90	166.00
						white oak	---	---
						chestnut oak	---	---
						scarlet oak	---	---
						black oak	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index[1]	Potential productivity: Volume
								cu ft/
EdC:								
Chestnut, stony----------	Slight	Slight	Slight	Moderate	Moderate	northern red oak----	76	58.00
						eastern white pine--	78	139.00
						scarlet oak---------	68	50.00
						white oak-----------	70	52.00
						black oak-----------	71	53.00
						chestnut oak--------	69	51.00
						shortleaf pine------	---	---
EdD:								
Edneyville, stony-------	Moderate	Moderate	Slight	Slight	Moderate	northern red oak----	80	62.00
						shortleaf pine------	64	97.00
						Virginia pine-------	66	102.00
						eastern white pine--	90	166.00
						white oak-----------	---	---
						chestnut oak--------	---	---
						scarlet oak---------	---	---
						black oak-----------	---	---
Chestnut, stony----------	Moderate	Moderate	Slight	Moderate	Moderate	northern red oak----	76	58.00
						eastern white pine--	78	139.00
						scarlet oak---------	68	50.00
						white oak-----------	70	52.00
						black oak-----------	71	53.00
						chestnut oak--------	69	51.00
						shortleaf pine------	---	---
EdE, EdF:								
Edneyville, stony-------	Severe	Severe	Slight	Slight	Moderate	northern red oak----	80	62.00
						shortleaf pine------	64	97.00
						Virginia pine-------	66	102.00
						eastern white pine--	90	166.00
						white oak-----------	---	---
						chestnut oak--------	---	---
						scarlet oak---------	---	---
						black oak-----------	---	---
Chestnut, stony----------	Severe	Severe	Slight	Moderate	Moderate	northern red oak----	76	58.00
						eastern white pine--	78	139.00
						scarlet oak---------	68	50.00
						white oak-----------	70	52.00
						black oak-----------	71	53.00
						chestnut oak--------	69	51.00
						shortleaf pine------	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index[1]	Volume
								cu ft/
EvD2:								
Evard, moderately eroded	Moderate	Moderate	Moderate	Slight	Moderate	eastern white pine	91	168.00
						yellow-poplar	95	98.00
						white oak	75	57.00
						Virginia pine	70	109.00
						shortleaf pine	73	116.00
						southern red oak	75	57.00
						hickory	---	---
Cowee, moderately eroded	Moderate	Moderate	Moderate	Moderate	Moderate	eastern white pine	78	139.00
						yellow-poplar	80	71.00
						chestnut oak	55	38.00
						Virginia pine	63	96.00
						scarlet oak	54	38.00
						shortleaf pine	---	---
						white oak	---	---
						southern red oak	---	---
						black oak	---	---
EvE2, EvF2:								
Evard, moderately eroded	Severe	Severe	moderate	Slight	Moderate	eastern white pine	91	168.00
						yellow-poplar	95	98.00
						white oak	75	57.00
						Virginia pine	70	109.00
						shortleaf pine	73	116.00
						southern red oak	75	57.00
						hickory	---	---
Cowee, moderately eroded	Severe	Severe	Moderate	Moderate	Moderate	eastern white pine	78	139.00
						yellow-poplar	80	71.00
						chestnut oak	55	38.00
						Virginia pine	63	96.00
						scarlet oak	54	38.00
						shortleaf pine	---	---
						white oak	---	---
						southern red oak	---	---
						black oak	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
EwC:								
Evard, stony	Slight	Slight	Slight	Slight	Moderate	eastern white pine	91	168.00
						yellow-poplar	95	98.00
						white oak	75	57.00
						Virginia pine	70	109.00
						shortleaf pine	73	116.00
						southern red oak	75	57.00
						hickory	---	---
						northern red oak	---	---
Cowee, stony	Slight	Slight	Slight	Moderate	Moderate	eastern white pine	78	139.00
						yellow-poplar	80	71.00
						chestnut oak	55	38.00
						Virginia pine	63	96.00
						scarlet oak	54	38.00
						shortleaf pine	---	---
						white oak	---	---
						northern red oak	---	---
						black oak	---	---
EwD:								
Evard, stony	Moderate	Moderate	Slight	Slight	Moderate	eastern white pine	91	168.00
						yellow-poplar	95	98.00
						white oak	75	57.00
						Virginia pine	70	109.00
						shortleaf pine	73	116.00
						southern red oak	75	57.00
						hickory	---	---
						northern red oak	---	---
Cowee, stony	Moderate	Moderate	Slight	Moderate	Moderate	eastern white pine	78	139.00
						yellow-poplar	80	71.00
						chestnut oak	55	38.00
						Virginia pine	63	96.00
						scarlet oak	54	38.00
						shortleaf pine	---	---
						white oak	---	---
						northern red oak	---	---
						black oak	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index[1]	Volume
								cu ft/
EwE, EwF:								
Evard, stony	Severe	Severe	Slight	Slight	Moderate	eastern white pine	91	168.00
						yellow-poplar	95	98.00
						white oak	75	57.00
						Virginia pine	70	109.00
						shortleaf pine	73	116.00
						southern red oak	75	57.00
						hickory	---	---
						northern red oak	---	---
Cowee, stony	Severe	Severe	Slight	Moderate	Moderate	eastern white pine	78	139.00
						yellow-poplar	80	71.00
						chestnut oak	55	38.00
						Virginia pine	63	96.00
						pitch pine	52	72.00
						scarlet oak	54	38.00
						shortleaf pine	---	---
						white oak	---	---
						northern red oak	---	---
						black oak	---	---
ExC, ExD, ExE:								
Evard	---	---	---	---	---	---	---	---
Cowee	---	---	---	---	---	---	---	---
Urban land.								
FaC2:								
Fannin, moderately eroded	Moderate	Slight	Moderate	Slight	Moderate	yellow-poplar	96	100.00
						northern red oak	84	66.00
						eastern white pine	94	174.00
						shortleaf pine	---	---
						Virginia pine	---	---
						scarlet oak	---	---
						chestnut oak	---	---
Lauada, moderately eroded	Moderate	Slight	Moderate	Moderate	Moderate	yellow-poplar	---	---
						northern red oak	---	---
						eastern white pine	---	---
						shortleaf pine	---	---
						Virginia pine	---	---
						scarlet oak	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
FaD2:								
Fannin, moderately eroded-----------------	Moderate	Moderate	Moderate	Slight	Moderate	yellow-poplar-------	96	100.00
						northern red oak----	84	66.00
						eastern white pine--	94	174.00
						shortleaf pine------	---	---
						Virginia pine-------	---	---
						scarlet oak---------	---	---
						chestnut oak--------	---	---
Lauada, moderately eroded-----------------	Moderate	Moderate	Moderate	Moderate	Moderate	yellow-poplar-------	---	---
						northern red oak----	---	---
						eastern white pine--	---	---
						shortleaf pine------	---	---
						Virginia pine-------	---	---
						scarlet oak---------	---	---
FaE2:								
Fannin, moderately eroded-----------------	Severe	Severe	Moderte	Slight	Moderate	yellow-poplar-------	96	100.00
						northern red oak----	84	66.00
						eastern white pine--	94	174.00
						shortleaf pine------	---	---
						Virginia pine-------	---	---
						scarlet oak---------	---	---
						chestnut oak--------	---	---
Lauada, moderately eroded-----------------	Severe	Severe	Moderate	Moderate	Moderate	yellow-poplar-------	---	---
						northern red oak----	---	---
						eastern white pine--	---	---
						shortleaf pine------	---	---
						Virginia pine-------	---	---
						scarlet oak---------	---	---
FnB, FnC, FnD:								
Fanin-------------------	---	---	---	---	---	---	---	---
Lauada------------------	---	---	---	---	---	---	---	---
Urban land.								

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
FrA:								
French, occasionally flooded	Slight	Moderate	Slight	Slight	Severe	eastern white pine	105	196.00
						yellow-poplar	105	115.00
						northern red oak	---	---
						black cherry	---	---
						red maple	---	---
						eastern hemlock	---	---
HcE:								
Heintooga, very stony	---	---	---	---	---	---	---	---
Chiltoskie, very stony	---	---	---	---	---	---	---	---
HpA:								
Hemphill, rarely flooded	Slight	Severe	Severe	Slight	Severe	yellow-poplar	---	---
						American sycamore	---	---
						eastern white pine	---	---
						eastern hemlock	---	---
						red maple	---	---
IoA:								
Iotla, occasionally flooded	Slight	Slight	Slight	Slight	Severe	American sycamore	---	---
						black oak	---	---
						black walnut	---	---
						eastern white pine	90	172.00
						northern red oak	---	---
						river birch	---	---
						white ash	---	---
						white oak	---	---
						yellow-poplar	100	114.00
JbB, JbC:								
Junaluska	Slight	Slight	Slight	Moderate	Moderate	scarlet oak	65	48.00
						chestnut oak	65	48.00
						white oak	61	44.00
						shortleaf pine	68	106.00
						Virginia pine	74	114.00
						eastern white pine	86	157.00
						black oak	---	---
						hickory	---	---
						black locust	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
JbB, JbC:								
Brasstown	Slight	Slight	Slight	Slight	Moderate	scarlet oak	80	62.00
						white oak	80	62.00
						eastern white pine	91	168.00
						shortleaf pine	71	112.00
						Virginia pine	74	114.00
						black oak	---	---
						chestnut oak	---	---
						hickory	---	---
						black locust	---	---
JbD:								
Junaluska	Moderate	Moderate	Moderate	Moderate	Moderate	scarlet oak	65	48.00
						chestnut oak	65	48.00
						white oak	61	44.00
						shortleaf pine	68	106.00
						Virginia pine	74	114.00
						eastern white pine	86	157.00
						black oak	---	---
						hickory	---	---
						black locust	---	---
Brasstown	Moderate	Moderate	Slight	Slight	Moderate	scarlet oak	80	62.00
						white oak	80	62.00
						eastern white pine	91	168.00
						shortleaf pine	71	112.00
						Virginia pine	74	114.00
						black oak	---	---
						chestnut oak	---	---
						hickory	---	---
						black locust	---	---
JbE:								
Junaluska	Severe	Severe	Moderate	Moderate	Moderate	scarlet oak	65	48.00
						chestnut oak	65	48.00
						white oak	61	44.00
						shortleaf pine	68	106.00
						Virginia pine	74	114.00
						eastern white pine	86	157.00
						black oak	---	---
						hickory	---	---
						black locust	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
JbE:								
Brasstown	Severe	Severe	Slight	Slight	Moderate	scarlet oak	80	62.00
						white oak	80	62.00
						eastern white pine	91	168.00
						shortleaf pine	71	112.00
						Virginia pine	74	114.00
						black oak	---	---
						chestnut oak	---	---
						hickory	---	---
						black locust	---	---
KsB, KsC:								
Kanuga	Slight	Slight	Slight	Slight	Moderate	Virginia pine	80	114.00
						eastern white pine	90	172.00
						shortleaf pine	75	114.00
						yellow-poplar	95	100.00
						southern red oak	---	---
Swannanoa	Slight	Slight	Slight	Slight	Moderate	Virginia pine	80	114.00
						eastern white pine	90	172.00
						shortleaf pine	75	114.00
						yellow-poplar	95	100.00
						southern red oak	---	---
MvD:								
Mars Hill, stony	Moderate	Moderate	Slight	Slight	Moderate	eastern white pine	87	159.00
						Virginia pine	75	115.00
						shortleaf pine	69	108.00
						white oak	69	51.00
						hickory	---	---
						chestnut oak	75	57.00
						black oak	---	---
						southern red oak	---	---
Walnut, stony	Moderate	Moderate	Slight	Moderate	Moderate	Virginia pine	---	---
						black oak	---	---
						chestnut oak	---	---
						eastern white pine	75	129.00
						hickory	---	---
						shortleaf pine	---	---
						white oak	---	---
						southern red oak	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index[1]	Volume
								cu ft/
MvE, MvF:								
Mars Hill, stony	Severe	Severe	Slight	Slight	Moderate	eastern white pine	87	159.00
						Virginia pine	75	115.00
						shortleaf pine	69	108.00
						white oak	69	51.00
						hickory	---	---
						chestnut oak	75	57.00
						black oak	---	---
						southern red oak	---	---
Walnut, stony	Severe	Severe	Slight	Moderate	Moderate	Virginia pine	---	---
						black oak	---	---
						chestnut oak	---	---
						eastern white pine	75	129.00
						hickory	---	---
						shortleaf pine	---	---
						white oak	---	---
						southern red oak	---	---
MwD:								
Micaville, stony	Moderate	Moderate	Moderate	Slight	Moderate	eastern white pine	88	157.00
						chestnut oak	76	57.00
						scarlet oak	---	---
						white oak	---	---
						hickory	---	---
						black oak	---	---
Brownwood, stony	Moderate	Moderate	Slight	Moderate	Moderate	chestnut oak	71	50.00
						black oak	69	51.00
						eastern white pine	78	139.00
						northern red oak	80	62.00
						scarlet oak	68	50.00
						white oak	70	52.00
MwE, MwF:								
Micaville, stony	Severe	Severe	Moderate	Slight	Moderate	eastern white pine	88	157.00
						chestnut oak	76	57.00
						scarlet oak	---	---
						white oak	---	---
						hickory	---	---
						black oak	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
MwE, MwF:								
Brownwood, stony	Severe	Severe	Slight	Moderate	Moderate	chestnut oak	71	50.00
						black oak	69	51.00
						eastern white pine	78	139.00
						northern red oak	80	62.00
						scarlet oak	68	50.00
						white oak	70	52.00
NkA:								
Nikwasi, frequently flooded	Slight	Severe	Severe	Slight	Severe	yellow-poplar	88	86.00
						eastern white pine	84	153.00
						American sycamore	---	---
						red maple	---	---
						yellow birch	---	---
						eastern hemlock	---	---
NtD:								
Northcove, very stony	Moderate	Moderate	Moderate	Slight	Moderate	yellow-poplar	---	---
						eastern white pine	80	143.00
						white oak	---	---
						eastern hemlock	---	---
						yellow birch	---	---
						northern red oak	---	---
						black cherry	---	---
						yellow buckeye	---	---
						sugar maple	---	---
Maymead, very stony	Moderate	Moderate	Slight	Slight	Severe	yellow poplar	125	145.00
						northern red oak	---	---
						eastern white pine	---	---
						black cherry	---	---
						yellow buckeye	---	---
						American beech	---	---
						eastern hemlock	---	---
						yellow birch	---	---
						northern red oak	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
NtE:								
Northcove, very stony---	Moderate	Severe	Moderate	Slight	Moderate	yellow-poplar-------	---	---
						eastern white pine--	80	143.00
						white oak-----------	---	---
						eastern hemlock-----	---	---
						yellow birch--------	---	---
						northern red oak----	---	---
						black cherry--------	---	---
						yellow buckeye------	---	---
						American beech------	---	---
Maymead, very stony-----	Moderate	Severe	Slight	Slight	Severe	yellow poplar ----	125	145.00
						northern red oak----	---	---
						eastern white pine--	---	---
						black cherry--------	---	---
						yellow buckeye------	---	---
						American beech------	---	---
						eastern hemlock-----	---	---
						yellow birch--------	---	---
						northern red oak----	---	---
OwC, OwD, OwE, OwF:								
Oconaluftee, windswept--	---	---	---	---	---	northern red oak----	40	29.00
Guyot, windswept--------	---	---	---	---	---	northern red oak----	40	29.00
Cataloochee, windswept--	---	---	---	---	---	northern red oak----	40	29.00
Pg.								
Pits, gravel								
Pt.								
Pits, quarry								
PwC:								
Porters, stony----------	Slight	Slight	Slight	Slight	Moderate	northern red oak----	82	64.00
						yellow-poplar-------	97	102.00
						eastern white pine--	88	162.00
						black cherry--------	---	---
						white ash-----------	---	---
Unaka, stony------------	Slight	Slight	Slight	Moderate	Moderate	yellow-poplar-------	90	86.00
						northern red oak----	77	57.00
						eastern white pine--	---	143.00

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index[1]	Volume
								cu ft/
PwD:								
Porters, stony	Moderate	Moderate	Slight	Slight	Moderate	northern red oak	82	64.00
						yellow-poplar	97	102.00
						eastern white pine	88	162.00
						black cherry	---	---
						white ash	---	---
Unaka, stony	Moderate	Moderate	Slight	Moderate	Moderate	yellow-poplar	90	86.00
						northern red oak	77	57.00
						eastern white pine	---	143.00
PwE:								
Porters, stony	Severe	Severe	Slight	Slight	Moderate	northern red oak	82	64.00
						yellow-poplar	97	102.00
						eastern white pine	88	162.00
						black cherry	---	---
						white ash	---	---
Unaka, stony	Severe	Severe	Slight	Moderate	Moderate	yellow-poplar	90	86.00
						northern red oak	77	57.00
						eastern white pine	---	143.00
PxF:								
Porters, rocky	Severe	Severe	Slight	Slight	Moderate	northern red oak	82	64.00
						yellow-poplar	97	102.00
						eastern white pine	88	162.00
						black cherry	---	---
						white ash	---	---
Unaka, rocky	Severe	Severe	Slight	Moderate	Moderate	yellow-poplar	90	86.00
						northern red oak	77	57.00
						eastern white pine	---	143.00
RdA:								
Reddies, occasionally flooded	Slight	Slight	Slight	Slight	Severe	yellow-poplar	105	115.00
						American sycamore	---	---
						red maple	---	---
						eastern white pine	---	---
						river birch	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index[1]	Volume
								cu ft/
RkF:								
Rock outcrop.								
Cleveland, very bouldery	---	---	---	---	---	chestnut oak--------	---	---
						eastern white pine--	---	---
						Virginia pine-------	---	---
						scarlet oak---------	---	---
						black oak-----------	---	---
						shortleaf pine------	---	---
						pitch pine----------	---	---
RoF:								
Rock outcrop.								
Oteen, very bouldery----	---	---	---	---	---	Virginia pine-------	64	98.00
						shortleaf pine------	67	103.00
						eastern white pine--	---	---
						pitch pine----------	---	---
						black oak-----------	---	---
						chestnut oak--------	---	---
RsA:								
Rosman, occasionally flooded----------------	Slight	Slight	Slight	Slight	Severe	yellow-poplar-------	40	114.00
						American sycamore---	---	---
						red maple-----------	---	---
						river birch---------	---	---
						black cherry--------	---	---
						American beech------	---	---
						black locust--------	---	---
SoD:								
Soco, stony-------------	Moderate	Moderate	Slight	Moderate	Moderate	eastern white pine--	85	155.00
						shortleaf pine------	61	90.00
						Virginia pine-------	---	---
						chestnut oak--------	68	50.00
						scarlet oak---------	76	58.00
						white oak-----------	---	---
						black oak-----------	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index[1]	Volume
								cu ft/
SoD:								
Stecoah, stony	Moderate	Moderate	Slight	Slight	Moderate	eastern white pine	91	168.00
						shortleaf pine	68	108.00
						scarlet oak	---	---
						white oak	82	64.00
						chestnut oak	---	---
						Virginia pine	---	---
						hickory	---	---
						black oak	---	---
SoE, SoF:								
Soco, stony	Severe	Severe	Slight	Moderate	Moderate	eastern white pine	85	155.00
						shortleaf pine	61	90.00
						Virginia pine	---	---
						chestnut oak	68	50.00
						scarlet oak	76	58.00
						white oak	---	---
						black oak	---	---
Stecoah, stony	Severe	Severe	Slight	Slight	Moderate	eastern white pine	91	168.00
						shortleaf pine	68	108.00
						scarlet oak	---	---
						white oak	82	64.00
						chestnut oak	---	---
						Virginia pine	---	---
						hickory	---	---
						black oak	---	---
StB:								
Statler, rarely flooded	Slight	Slight	Slight	Slight	Severe	yellow-poplar	100	107.00
						white oak	80	62.00
						eastern white pine	90	166.00
						red maple	---	---
						northern red oak	---	---
						hickory	---	---
SyD:								
Sylco, stony	Moderate	Moderate	Severe	Moderate	Moderate	scarlet oak	64	47.00
						shortleaf pine	---	---
						Virginia pine	---	---
						chestnut oak	---	---
						black oak	63	46.00

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index[1]	Volume
								cu ft/
SyD:								
Soco, stony	Moderate	Moderate	Moderate	Moderate	Moderate	eastern white pine	85	155.00
						shortleaf pine	61	90.00
						Virginia pine	---	---
						chestnut oak	68	50.00
						scarlet oak	76	58.00
						white oak	---	---
						black oak	---	---
SyE:								
Sylco, stony	Moderate	Severe	Severe	Moderate	Moderate	scarlet oak	64	47.00
						shortleaf pine	---	---
						Virginia pine	---	---
						chestnut oak	---	---
						black oak	63	46.00
Soco, stony	Severe	Severe	Slight	Moderate	Moderate	eastern white pine	85	155.00
						shortleaf pine	61	90.00
						pitch pine	---	---
						Virginia pine	---	---
						chestnut oak	68	50.00
						scarlet oak	76	58.00
						white oak	---	---
						black oak	---	---
SzF:								
Sylco, very stony	Moderate	Severe	Severe	Moderate	Moderate	scarlet oak	64	47.00
						shortleaf pine	---	---
						Virginia pine	---	---
						chestnut oak	---	---
						black oak	63	46.00
Soco, very stony	Severe	Severe	Moderate	Moderate	Moderate	eastern white pine	85	155.00
						shortleaf pine	61	90.00
						Virginia pine	---	---
						chestnut oak	68	50.00
						scarlet oak	76	58.00
						white oak	---	---
						black oak	---	---
TaB, TaC:								
Tate	Slight	Slight	Slight	Slight	Moderate	yellow-poplar	92	83.00
						eastern white pine	89	164.00
						northern red oak	---	---
						black locust	---	---
						eastern hemlock	---	---
						white oak	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index[1]	Volume
								cu ft/
TaD:								
Tate	Moderate	Moderate	Slight	Slight	Moderate	yellow-poplar	92	83.00
						eastern white pine	89	164.00
						northern red oak	---	---
						black locust	---	---
						eastern hemlock	---	---
						white oak	---	---
TkC:								
Tate, stony	Slight	Slight	Slight	Slight	Moderate	yellow-poplar	92	83.00
						eastern white pine	89	164.00
						northern red oak	---	---
						black locust	---	---
						eastern hemlock	---	---
						white oak	---	---
TkD:								
Tate, stony	Moderate	Moderate	Slight	Slight	Moderate	yellow-poplar	92	83.00
						eastern white pine	89	164.00
						northern red oak	---	---
						black locust	---	---
						eastern hemlock	---	---
						white oak	---	---
TmB, TmC, TmD:								
Tate	---	---	---	---	---	---	---	---
Urban land.								
TnE:								
Toecane, extremely bouldery	Severe	Severe	Moderate	Slight	Moderate	yellow-poplar	104	114.00
						eastern hemlock	---	---
						yellow birch	---	---
						northern red oak	---	---
						black cherry	---	---
ToC:								
Toecane, bouldery	Slight	Moderate	Slight	Slight	Severe	yellow-poplar	104	114.00
						eastern hemlock	---	---
						yellow birch	---	---
						northern red oak	---	---
						black cherry	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
ToC:								
Tusquitee, bouldery-----	Slight	Moderate	Slight	Slight	Severe	yellow-poplar-------	103	112.00
						eastern white pine--	100	186.00
						northern red oak----	---	---
						black cherry--------	83	---
						hickory-----------	---	---
						black locust--------	---	---
						eastern hemlock-----	---	---
						white oak-----------	---	---
						American beech------	---	---
						white ash-----------	---	---
TpD:								
Toecane, very bouldery--	Moderate	Severe	Slight	Slight	Severe	yellow-poplar-------	104	114.00
						eastern hemlock-----	---	---
						yellow birch--------	---	---
						northern red oak----	---	---
						black cherry--------	---	---
Tusquitee, very bouldery	Moderate	Severe	Slight	Slight	Severe	yellow-poplar-------	103	112.00
						eastern white pine--	100	186.00
						northern red oak----	---	---
						black cherry--------	83	---
						hickory-----------	---	---
						black locust--------	---	---
						eastern hemlock-----	---	---
						white oak-----------	---	---
						American beech------	---	---
						white ash-----------	---	---
TpE:								
Toecane, very bouldery--	Severe	Severe	Slight	Slight	Severe	yellow-poplar-------	104	114.00
						eastern hemlock-----	---	---
						yellow birch--------	---	---
						northern red oak----	---	---
						black cherry--------	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index[1]	Potential productivity: Volume
								cu ft/
TpE:								
Tusquitee, very bouldery	Severe	Severe	Slight	Slight	Severe	yellow-poplar-------	103	112.00
						eastern white pine--	100	186.00
						northern red oak----	---	---
						black cherry--------	83	---
						hickory-----------	---	---
						black locust--------	---	---
						eastern hemlock-----	---	---
						white oak-----------	---	---
						American beech------	---	---
						white ash-----------	---	---
TsA:								
Toxaway, frequently flooded----------------	Slight	Severe	Severe	Slight	Severe	eastern white pine--	94	172.00
						yellow-poplar-------	85	86.00
						northern red oak----	---	---
						shortleaf pine------	---	---
						Virginia pine-------	---	---
						red maple-----------	---	---
						American sycamore---	---	---
						yellow birch--------	---	---
TtE:								
Trimont, stony----------	Severe	Severe	Slight	Slight	Moderate	yellow-poplar-------	102	114.00
						northern red oak----	94	76.00
						black oak-----------	---	---
						white oak-----------	---	---
						American beech------	---	---
						black locust--------	---	---
						red maple-----------	---	---
TuD:								
Tusquitee, stony--------	Moderate	Moderate	Slight	Slight	Severe	yellow-poplar-------	103	112.00
						eastern white pine--	100	186.00
						northern red oak----	---	---
						black cherry--------	83	---
						hickory-----------	---	---
						black locust--------	---	---
						eastern hemlock-----	---	---
						white oak-----------	---	---
						American beech------	---	---
						white ash-----------	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
TuD:								
Toecane, stony	Moderate	Moderate	Moderate	Slight	Moderate	yellow-poplar	104	114.00
						eastern hemlock	---	---
						yellow birch	---	---
						northern red oak	---	---
						black cherry	---	---
TwB, TwC:								
Tusquitee	Slight	Slight	Slight	Slight	Severe	yellow-poplar	103	112.00
						eastern white pine	100	186.00
						northern red oak	---	---
						black cherry	83	---
						hickory	---	---
						black locust	---	---
						eastern hemlock	---	---
						white oak	---	---
						American beech	---	---
						white ash	---	---
Whiteside	Slight	Slight	Slight	Slight	Severe	yellow-poplar	95	98.00
						eastern white pine	90	166.00
						black cherry	90	---
						eastern hemlock	---	---
						sugar maple	---	---
						red maple	---	---
						white oak	---	---
						sweet birch	---	---
						black locust	---	---
UcB:								
Udifluvents, sandy, frequently flooded	---	---	---	---	---	---	---	---
Ud:								
Udorthents, loamy	---	---	---	---	---	---	---	---
UfB:								
Udorthents, occasionally flooded	---	---	---	---	---	---	---	---
Urban land.								
UhE:								
Udorthents	---	---	---	---	---	---	---	---
Urban land.								

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
UkD, UkE, UkF:								
Unaka, very bouldery	---	---	---	---	---	yellow-poplar	90	86.00
						eastern white pine	---	143.00
						northern red oak	77	57.00
Rock outcrop.								
UnB, UnC:								
Unison	Slight	Slight	Slight	Slight	Severe	yellow-poplar	---	---
						eastern white pine		
						short leaf pine		
						white oak		
						northern red oak		
UnD:								
Unison	Slight	Moderate	Slight	Slight	Severe	yellow-poplar	---	---
						eastern white pine		
						short leaf pine		
						white oak		
						northern red oak		
UrB, UrC:								
Unison	Slight	Slight	Slight	Slight	Severe	---	---	---
Urban land.								
Ux.								
Urban land								
W.								
Water								
WaC2:								
Walnut, moderately eroded	Moderate	Slight	Slight	Moderate	Moderate	Virginia pine	---	---
						black oak	---	---
						chestnut oak	---	---
						eastern white pine	75	129.00
						hickory	---	---
						shortleaf pine	---	---
						white oak	---	---
						pitch pine	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index[1]	Volume[2]
								cu ft/a
WaC2:								
Oteen, moderately eroded	Moderate	Slight	Severe	Severe	Slight	Virginia pine	64	98.00
						shortleaf pine	67	103.00
						black oak	---	---
						chestnut oak	---	---
Mars Hill, moderately eroded	Moderate	Slight	Slight	Slight	Moderate	eastern white pine	87	159.00
						Virginia pine	75	115.00
						shortleaf pine	69	108.00
						white oak	69	51.00
						hickory	---	---
						chestnut oak	75	57.00
						black oak	---	---
WaD2:								
Walnut, moderately eroded	Moderate	Moderate	Slight	Moderate	Moderate	Virginia pine	---	---
						black oak	---	---
						chestnut oak	---	---
						eastern white pine	75	129.00
						hickory	---	---
						shortleaf pine	---	---
						white oak	---	---
Oteen, moderately eroded	Moderate	Moderate	Severe	Severe	Slight	Virginia pine	64	98.00
						shortleaf pine	67	103.00
						black oak	---	---
						chestnut oak	---	---
Mars Hill, moderately eroded	Moderate	Moderate	Slight	Slight	Moderate	eastern white pine	87	159.00
						Virginia pine	75	115.00
						shortleaf pine	69	108.00
						white oak	69	51.00
						hickory	---	---
						chestnut oak	75	57.00
						black oak	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
WaE2:								
Walnut, moderately eroded	Severe	Severe	Slight	Moderate	Moderate	Virginia pine	---	---
						black oak	---	---
						chestnut oak	---	---
						eastern white pine	75	129.00
						hickory	---	---
						shortleaf pine	---	---
						white oak	---	---
Oteen, moderately eroded	Severe	Severe	Severe	Severe	Slight	Virginia pine	64	98.00
						shortleaf pine	67	103.00
						black oak	---	---
						chestnut oak	---	---
Mars Hill, moderately eroded	Severe	Severe	Slight	Slight	Moderate	eastern white pine	87	159.00
						Virginia pine	75	115.00
						shortleaf pine	69	108.00
						white oak	69	51.00
						hickory	---	---
						chestnut oak	75	57.00
						black oak	---	---
WnF:								
Walnut	---	---	---	---	---	Virginia pine	---	---
						black oak	---	---
						chestnut oak	---	---
						eastern white pine	---	---
						hickory	---	---
						shortleaf pine	---	---
						white oak	---	---
Oteen	---	---	---	---	---	Virginia pine	---	---
						shortleaf pine	---	---
						black oak	---	---
						chestnut oak	---	---
Rock outcrop.								

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index[1]	Volume
								cu ft/
WoE:								
Wayah, bouldery----------	Severe	Severe	Slight	Slight	Moderate	northern red oak----	72	57.00
						black cherry--------	72	43.00
						red spruce----------	57	114.00
						Fraser fir----------	60	---
						American beech------	64	43.00
						yellow birch--------	---	---
						sugar maple---------	---	---
						black oak-----------	---	---
						yellow buckeye------	---	---
						eastern hemlock-----	---	---
						sweet birch---------	---	---
Burton, bouldery---------	Severe	Severe	Slight	Moderate	Slight	northern red oak----	---	43.00
						red spruce----------	---	---
						American beech------	---	---
						Fraser fir----------	---	---
						American mountainash	---	---
						yellow birch--------	---	---
						sugar maple---------	---	---
WpF:								
Wayah, very rocky--------	Severe	Severe	Slight	Slight	Moderate	northern red oak----	72	57.00
						black cherry--------	72	43.00
						red spruce----------	57	114.00
						Fraser fir----------	60	---
						American beech------	64	43.00
						yellow birch--------	---	---
						sugar maple---------	---	---
						black oak-----------	---	---
						yellow buckeye------	---	---
						eastern hemlock-----	---	---
						sweet birch---------	---	---
Burton, very rocky-------	Severe	Severe	Slight	Moderate	Slight	northern red oak----	---	43.00
						red spruce----------	---	---
						American beech------	---	---
						Fraser fir----------	---	---
						American mountainash	---	---
						yellow birch--------	---	---
						sugar maple---------	---	---
WrC, WrD, WrE:								
Wayah, windswept---------	---	---	---	---	---	northern red oak----	43	28.00
Burton, windswept--------	---	---	---	---	---	northern red oak----	---	---

Table 9.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index[1]	Volume
								cu ft/
WsF:								
Wayah, windswept--------	---	---	---	---	---	northern red oak----	43	28.00
Burton, windswept-------	---	---	---	---	---	northern red oak----	---	---
WtB, WtC:								
Whiteside---------------	Slight	Slight	Slight	Slight	Severe	black cherry--------	90	57.00
						black locust--------	---	---
						eastern hemlock-----	---	---
						eastern white pine--	90	172.00
						red maple-----------	---	---
						sweet birch---------	---	---
						white oak-----------	---	---
						yellow-poplar-------	95	100.00
ZcB, ZcC:								
Zillicoa----------------	Slight	Slight	Slight	Slight	Slight	Virginia pine-------	---	---
						hickory-------------	---	---
						shortleaf pine------	63	100.00
						white oak-----------	---	---
						yellow-poplar-------	88	86.00
ZoD:								
Zillicoa, stony---------	Moderate	Moderate	Slight	Slight	Slight	Virginia pine-------	---	---
						hickory-------------	---	---
						shortleaf pine------	63	100.00
						white oak-----------	---	---
						yellow-poplar-------	88	86.00

[1] Site indices were assigned using available plot data and comparison curves. Where insufficient pl index was assigned based on data from soils with similar properties. Where no data and no soil with simi soils were assigned a probable ordination symbol without any site indices. Site index may vary considera the same soil because of the influence of past management, climate, relief, landform position, aspect, dr material, and elevation.

[2] Potential productivity is measured as yield in cubic feet per acre per year calculated at the age mean annual increment for fully stocked, natural stands. Cubic feet can be converted to board feet by mu

[3] If hardwoods are desired on a forest site, rely on natural reproduction (seeds and sprouts) of acc Special site preparation techniques may be required. Planting of hardwoods on a site should be based on of a professional forester.

[4] This is a noncommercial forest land unit. See map unit descriptions for composition and managemen

Table 10.—Recreational Development, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
AcD:				
Ashe, very stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
Cleveland, very stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.53	Large stones content	0.53
Rock outcrop	Not rated		Not rated	
ArE:				
Ashe, very bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Cleveland, very bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.47	Large stones content	0.47
Rock outcrop	Not rated		Not rated	
ArF:				
Ashe, very bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Cleveland, very bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.47	Large stones content	0.47
Rock outcrop	Not rated		Not rated	
BaD:				
Balsam, extremely bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
BaD:				
Tanasee, extremely bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
BaE:				
Balsam, extremely bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
Tanasee, extremely bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
BeA:				
Biltmore, occasionally flooded	Very limited		Somewhat limited	
	Flooding	1.00	Too sandy	0.42
	Too sandy	0.42		
BkB2:				
Braddock, moderately eroded	Not limited		Not limited	
BkC2:				
Braddock, moderately eroded	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
BkD2:				
Braddock, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
BnB:				
Braddock	Not limited		Not limited	
Urban land	Not rated		Not rated	
BnC:				
Braddock	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Urban land	Not rated		Not rated	
BpF:				
Breakneck, windswept	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Pullback, windswept	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Slope	0.50	Slope	0.50

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
BwD:				
Burton, windswept---	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
Craggey, windswept--	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
BxE:				
Burton, windswept---	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Craggey, windswept--	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.47	Large stones content	0.47
Rock outcrop--------	Not rated		Not rated	
BxF:				
Burton, windswept---	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Craggey, windswept--	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.47	Large stones content	0.47
Rock outcrop--------	Not rated		Not rated	
CaE:				
Cataska, very rocky-	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.99	Large stones content	0.99
Sylco, very rocky---	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
CdF:				
Cataska, very stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.53	Large stones content	0.53
Sylco, very stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
Rock outcrop	Not rated		Not rated	
ChD:				
Cheoah, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Jeffrey, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
ChE:				
Cheoah, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Jeffrey, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
ChF:				
Cheoah, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Jeffrey, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
CkB2:				
Clifton, moderately eroded	Not limited		Not limited	
CkC2:				
Clifton, moderately eroded	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
CkD2:				
Clifton, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
CkE2:				
Clifton, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
CsB:				
Clifton, stony------	Not limited		Not limited	
CsC:				
Clifton, stony------	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
CsD:				
Clifton, stony------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
CuB:				
Clifton------------	Not limited		Not limited	
Urban land----------	Not rated		Not rated	
CuC:				
Clifton------------	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Urban land----------	Not rated		Not rated	
CuD:				
Clifton------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Urban land----------	Not rated		Not rated	
CxE:				
Craggey, windswept--	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
Rock outcrop--------	Not rated		Not rated	
Clingman, windswept-	Not rated		Not rated	
CxF:				
Craggey, windswept--	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
Rock outcrop--------	Not rated		Not rated	
Clingman, windswept-	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Organic matter content	1.00	Organic matter content	1.00
	Large stones content	1.00	Large stones content	1.00
	Too acid	1.00	Too acid	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
DAM:				
Dam----------------	Not rated		Not rated	

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
DeA:				
Dellwood, occasionally flooded-----------	Very limited		Somewhat limited	
	Flooding	1.00	Gravel content	0.06
	Gravel content	0.06		
Reddies, occasionally flooded-----------	Very limited		Not limited	
	Flooding	1.00		
DrB:				
Dillard, rarely flooded-----------	Very limited		Not limited	
	Flooding	1.00		
EdC:				
Edneyville, stony---	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Chestnut, stony-----	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
EdD:				
Edneyville, stony---	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Chestnut, stony-----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EdE:				
Edneyville, stony---	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Chestnut, stony-----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EdF:				
Edneyville, stony---	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Chestnut, stony-----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EvD2:				
Evard, moderately eroded------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cowee, moderately eroded------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EvE2:				
Evard, moderately eroded------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
EvE2:				
Cowee, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EvF2:				
Evard, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cowee, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EwC:				
Evard, stony	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Cowee, stony	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
EwD:				
Evard, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cowee, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EwE:				
Evard, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cowee, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
EwF:				
Evard, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cowee, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
ExC:				
Evard	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Cowee	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Urban land	Not rated		Not rated	
ExD:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Urban land	Not rated		Not rated	

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
ExE:				
Evard	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cowee	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Urban land	Not rated		Not rated	
FaC2:				
Fannin, moderately eroded	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Lauada, moderately eroded	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
FaD2:				
Fannin, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Lauada, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
FaE2:				
Fannin, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Lauada, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
FnB:				
Fannin, moderately eroded	Not limited		Not limited	
Lauada, moderately eroded	Not limited		Not limited	
Urban land	Not rated		Not rated	
FnC:				
Fannin, moderately eroded	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Lauada, moderately eroded	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Urban land	Not rated		Not rated	
FnD:				
Fannin, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
FnD:				
Lauada, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Urban land	Not rated		Not rated	
FrA:				
French, occasionally flooded	Very limited		Somewhat limited	
	Flooding	1.00	Depth to saturated zone	0.48
	Depth to saturated zone	0.81		
HcE:				
Heintooga, very stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.99	Large stones content	0.99
Chiltoskie, very stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
HpA:				
Hemphill, rarely flooded	Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Flooding	1.00	Slow water movement	0.96
	Slow water movement	0.96		
IoA:				
Iotla, occasionally flooded	Very limited		Somewhat limited	
	Flooding	1.00	Depth to saturated zone	0.43
	Depth to saturated zone	0.77		
JbB:				
Junaluska	Not limited		Not limited	
Brasstown	Not limited		Not limited	
JbC:				
Junaluska	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Brasstown	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
JbD:				
Junaluska-----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Brasstown-----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
JbE:				
Junaluska-----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Brasstown-----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
KsB:				
Kanuga--------------	Somewhat limited		Somewhat limited	
	Slow water movement	0.26	Slow water movement	0.26
Swannanoa-----------	Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.77	Depth to saturated zone	0.43
	Slow water movement	0.26	Slow water movement	0.26
KsC:				
Kanuga--------------	Somewhat limited		Somewhat limited	
	Slope	0.37	Slope	0.37
	Slow water movement	0.26	Slow water movement	0.26
Swannanoa-----------	Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.77	Depth to saturated zone	0.43
	Slope	0.37	Slope	0.37
	Slow water movement	0.26	Slow water movement	0.26
MvD:				
Mars Hill, stony----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too sandy	0.01	Too sandy	0.01
Walnut, stony-------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
MvE:				
Mars Hill, stony----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too sandy	0.01	Too sandy	0.01
Walnut, stony-------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
MvF:				
Mars Hill, stony----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too sandy	0.01	Too sandy	0.01
Walnut, stony-------	Very limited		Very limited	
	Slope	1.00	Slope	1.00

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
MwD:				
Micaville, stony----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.25	Gravel content	0.25
Brownwood, stony----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
MwE:				
Micaville, stony----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.25	Gravel content	0.25
Brownwood, stony----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
MwF:				
Micaville, stony----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.25	Gravel content	0.25
Brownwood, stony----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
NkA:				
Nikwasi, frequently flooded-----------	Very limited		Very limited	
	Depth to saturated zone	1.00	Ponding	1.00
	Flooding	1.00	Depth to saturated zone	1.00
	Ponding	1.00	Flooding	0.40
NtD:				
Northcove, very stony--------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
Maymead, very stony-	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
NtE:				
Northcove, very stony--------------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas		Picnic areas	
	Rating class and limiting features	Value	Rating class and limiting features	Value
NtE:				
Maymead, very stony-	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
OwC:				
Oconaluftee, windswept----------	Somewhat limited		Somewhat limited	
	Slope	0.37	Slope	0.37
	Gravel content	0.21	Gravel content	0.21
Guyot, windswept----	Somewhat limited		Somewhat limited	
	Slope	0.37	Slope	0.37
Cataloochee, windswept----------	Very limited		Very limited	
	Too acid	1.00	Too acid	1.00
	Slope	0.37	Slope	0.37
OwD:				
Oconaluftee, windswept----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.21	Gravel content	0.21
Guyot, windswept----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cataloochee, windswept----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too acid	1.00	Too acid	1.00
OwE:				
Oconaluftee, windswept----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.21	Gravel content	0.21
Guyot, windswept----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cataloochee, windswept----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too acid	1.00	Too acid	1.00
OwF:				
Oconaluftee, windswept----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.21	Gravel content	0.21
Guyot, windswept----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Cataloochee, windswept----------	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too acid	1.00	Too acid	1.00

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
Pg:				
Pits, gravel	Not rated		Not rated	
Pt:				
Pits, quarry	Not rated		Not rated	
PwC:				
Porters, stony	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Unaka, stony	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
PwD:				
Porters, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Unaka, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
PwE:				
Porters, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Unaka, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
PxF:				
Porters, rocky	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Unaka, rocky	Very limited		Very limited	
	Slope	1.00	Slope	1.00
RdA:				
Reddies, occasionally flooded	Very limited		Not limited	
	Flooding	1.00		
RkF:				
Rock outcrop	Not rated		Not rated	
Cleveland, very bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.53	Large stones content	0.53
RoF:				
Rock outcrop	Not rated		Not rated	
Oteen, very bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Large stones content	0.47	Large stones content	0.47

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
RsA:				
Rosman, occasionally flooded	Very limited		Not limited	
	Flooding	1.00		
SoD:				
Soco, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.26	Slow water movement	0.26
Stecoah, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
SoE:				
Soco, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.26	Slow water movement	0.26
Stecoah, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
SoF:				
Soco, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.26	Slow water movement	0.26
Stecoah, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
StB:				
Statler, rarely flooded	Very limited		Not limited	
	Flooding	1.00		
SyD:				
Sylco, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Soco, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
SyE:				
Sylco, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Soco, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
SzF:				
Sylco, very stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
Soco, very stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
TaB:				
Tate	Not limited		Not limited	
TaC:				
Tate	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
TaD:				
Tate	Very limited		Very limited	
	Slope	1.00	Slope	1.00
TkC:				
Tate, very stony	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
	Large stones content	0.53	Large stones content	0.53
TkD:				
Tate, very stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
TmB:				
Tate	Not limited		Not limited	
Urban land	Not rated		Not rated	
TmC:				
Tate	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Urban land	Not rated		Not rated	
TmD:				
Tate	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Urban land	Not rated		Not rated	
TnE:				
Toecane, extremely bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	1.00	Large stones content	1.00
ToC:				
Toecane, bouldery	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Tusquitee, bouldery	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
TpD:				
Toecane, very bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Tusquitee, very bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
	Gravel content	0.07	Gravel content	0.07
TpE:				
Toecane, very bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Tusquitee, very bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
	Gravel content	0.07	Gravel content	0.07
TsA:				
Toxaway, frequently flooded	Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Flooding	1.00	Flooding	0.40
TtE:				
Trimont, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.05	Gravel content	0.05
TuD:				
Tusquitee, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Gravel content	0.07	Gravel content	0.07
Toecane, stony	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.03	Large stones content	0.03
TwB:				
Tusquitee	Not limited		Not limited	
Whiteside	Not limited		Not limited	

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
TwC:				
Tusquitee----------	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Whiteside----------	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
UcB:				
Udifluvents, frequently flooded-	Very limited		Very limited	
	Flooding	1.00	Too sandy	1.00
	Too sandy	1.00	Flooding	0.40
Ud:				
Udorthents, loamy---	Somewhat limited		Somewhat limited	
	Slow water movement	0.15	Slow water movement	0.15
	Slope	0.01	Slope	0.01
UfB:				
Udorthents, occasionally flooded-----------	Very limited		Not limited	
	Flooding	1.00		
Urban land, occasionally flooded-----------	Not rated		Not rated	
UhE:				
Udorthents, rocky---	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Urban land----------	Not rated		Not rated	
UkD:				
Unaka, very bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Rock outcrop--------	Not rated		Not rated	
UkE:				
Unaka, very bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Rock outcrop--------	Not rated		Not rated	
UkF:				
Unaka, very bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47
Rock outcrop--------	Not rated		Not rated	
UnB:				
Unison--------------	Not limited		Not limited	

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
UnC:				
Unison	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
UnD:				
Unison	Very limited		Very limited	
	Slope	1.00	Slope	1.00
UrB:				
Unison	Not limited		Not limited	
Urban land	Not rated		Not rated	
UrC:				
Unison	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Urban land	Not rated		Not rated	
Ux:				
Urban land	Not rated		Not rated	
W:				
Water	Not rated		Not rated	
WaC2:				
Walnut, moderately eroded	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Oteen, moderately eroded	Very limited		Very limited	
	Depth to bedrock	1.00	Depth to bedrock	1.00
	Slope	0.63	Slope	0.63
Mars Hill, moderately eroded	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
	Too sandy	0.01	Too sandy	0.01
WaD2:				
Walnut, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Oteen, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
Mars Hill, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too sandy	0.01	Too sandy	0.01
WaE2:				
Walnut, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
WaE2:				
Oteen, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
Mars Hill, moderately eroded	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Too sandy	0.01	Too sandy	0.01
WnF:				
Walnut	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Oteen	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Depth to bedrock	1.00
Rock outcrop	Not rated		Not rated	
WoE:				
Wayah, bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Burton, bouldery	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.03	Large stones content	0.03
WpF:				
Wayah, very rocky	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
Burton, very rocky	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53
WrC:				
Wayah, windswept	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
Burton, windswept	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
WrD:				
Wayah, windswept	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Burton, windswept	Very limited		Very limited	
	Slope	1.00	Slope	1.00
WrE:				
Wayah, windswept	Very limited		Very limited	
	Slope	1.00	Slope	1.00

Table 10.—Recreational Development, Part I—Continued

Map symbol and soil name	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value
WrE:				
Burton, windswept---	Very limited		Very limited	
	Slope	1.00	Slope	1.00
WsF:				
Wayah, windswept----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
Burton, windswept---	Very limited		Very limited	
	Slope	1.00	Slope	1.00
WtB:				
Whiteside-----------	Not limited		Not limited	
WtC:				
Whiteside-----------	Somewhat limited		Somewhat limited	
	Slope	0.63	Slope	0.63
ZcB:				
Zillicoa------------	Somewhat limited		Somewhat limited	
	Slow water movement	0.96	Slow water movement	0.96
ZcC:				
Zillicoa------------	Somewhat limited		Somewhat limited	
	Slow water movement	0.96	Slow water movement	0.96
	Slope	0.63	Slope	0.63
ZoD:				
Zillicoa, stony-----	Very limited		Very limited	
	Slope	1.00	Slope	1.00
	Slow water movement	0.96	Slow water movement	0.96

Table 10.—Recreational Development, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AcD:						
Ashe, very stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Depth to bedrock	0.46
	Depth to bedrock	0.46			Droughty	0.04
	Gravel content	0.02				
Cleveland, very stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.53	Droughty	1.00
	Gravel content	0.56			Depth to bedrock	1.00
	Large stones content	0.53				
Rock outcrop	Not rated		Not rated		Not rated	
ArE:						
Ashe, very bouldery	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47	Depth to bedrock	0.46
	Depth to bedrock	0.46			Droughty	0.04
	Gravel content	0.02				
Cleveland, very bouldery	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.47	Droughty	1.00
	Gravel content	0.56			Depth to bedrock	1.00
	Large stones content	0.47				
Rock outcrop	Not rated		Not rated		Not rated	
ArF:						
Ashe, very bouldery	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47	Depth to bedrock	0.46
	Depth to bedrock	0.46			Droughty	0.04
	Gravel content	0.02				
Cleveland, very bouldery	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.47	Droughty	1.00
	Gravel content	0.56			Depth to bedrock	1.00
	Large stones content	0.47				
Rock outcrop	Not rated		Not rated		Not rated	

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
BaD:						
Balsam, extremely bouldery	Very limited		Very limited		Very limited	
	Large stones content	1.00	Large stones content	1.00	Slope	1.00
	Slope	1.00	Slope	0.92	Large stones content	1.00
	Gravel content	0.86				
Tanasee, extremely bouldery	Very limited		Very limited		Very limited	
	Large stones content	1.00	Large stones content	1.00	Slope	1.00
	Slope	1.00	Slope	0.92	Large stones content	0.01
	Gravel content	0.43				
BaE:						
Balsam, extremely bouldery	Very limited		Very limited		Very limited	
	Large stones content	1.00	Slope	1.00	Slope	1.00
	Slope	1.00	Large stones content	1.00	Large stones content	1.00
	Gravel content	0.86				
Tanasee, extremely bouldery	Very limited		Very limited		Very limited	
	Large stones content	1.00	Slope	1.00	Slope	1.00
	Slope	1.00	Large stones content	1.00	Large stones content	0.01
	Gravel content	0.43				
BeA:						
Biltmore, occasionally flooded	Somewhat limited		Somewhat limited		Somewhat limited	
	Flooding	0.60	Too sandy	0.42	Flooding	0.60
	Too sandy	0.42			Droughty	0.09
BkB2:						
Braddock, moderately eroded	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.32				
BkC2:						
Braddock, moderately eroded	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.32				
BkD2:						
Braddock, moderately eroded	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.32				
BnB:						
Braddock	Very limited		Not limited		Not limited	
	Slope	1.00				
	Gravel content	0.32				

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
BnB:						
Urban land	Not rated		Not rated		Not rated	
BnC:						
Braddock	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.32				
Urban land	Not rated		Not rated		Not rated	
BpF:						
Breakneck, windswept	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.65			Depth to bedrock	0.65
	Gravel content	0.13			Large stones content	0.26
					Droughty	0.01
Pullback, windswept	Very limited		Not limited		Very limited	
	Slope	1.00			Depth to bedrock	1.00
	Depth to bedrock	1.00			Droughty	0.96
					Slope	0.50
					Large stones content	0.01
BwD:						
Burton, windswept	Very limited		Very limited		Very limited	
	Large stones content	1.00	Large stones content	1.00	Slope	1.00
					Depth to bedrock	0.54
	Slope	1.00	Slope	0.92	Large stones content	0.16
	Depth to bedrock	0.54				
	Gravel content	0.51				
Craggey, windswept	Very limited		Very limited		Very limited	
	Large stones content	1.00	Large stones content	1.00	Slope	1.00
					Depth to bedrock	1.00
	Slope	1.00	Slope	0.92	Droughty	0.99
	Depth to bedrock	1.00				
	Gravel content	0.44				
BxE:						
Burton, windswept	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.54	Large stones content	0.47	Depth to bedrock	0.54
	Gravel content	0.51			Large stones content	0.16
	Large stones content	0.47				
Craggey, windswept	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.47	Depth to bedrock	1.00
	Large stones content	0.47			Droughty	0.99
	Gravel content	0.44				
Rock outcrop	Not rated		Not rated		Not rated	

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
BxF:						
Burton, windswept	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.54	Large stones content	0.47	Depth to bedrock	0.54
	Gravel content	0.51			Large stones content	0.16
	Large stones content	0.47				
Craggey, windswept	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.47	Depth to bedrock	1.00
	Large stones content	0.47			Droughty	0.99
	Gravel content	0.44				
Rock outcrop	Not rated		Not rated		Not rated	
CaE:						
Cataska, very rocky	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.99	Large stones content	1.00
	Large stones content	0.99			Droughty	1.00
					Depth to bedrock	1.00
Sylco, very rocky	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Large stones content	1.00
	Depth to bedrock	0.46			Depth to bedrock	0.46
					Droughty	0.01
CdF:						
Cataska, very stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.53	Droughty	1.00
	Large stones content	0.53			Depth to bedrock	1.00
					Large stones content	0.68
Sylco, very stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.95	Large stones content	0.53	Large stones content	0.97
	Large stones content	0.53			Depth to bedrock	0.95
					Droughty	0.45
Rock outcrop	Not rated		Not rated		Not rated	
ChD:						
Cheoah, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
Jeffrey, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Depth to bedrock	0.35
	Depth to bedrock	0.35				

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ChE:						
Cheoah, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Jeffrey, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Depth to bedrock	0.35
	Depth to bedrock	0.35				
ChF:						
Cheoah, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Jeffrey, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Depth to bedrock	0.35
	Depth to bedrock	0.35				
CkB2:						
Clifton, moderately eroded	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.04				
CkC2:						
Clifton, moderately eroded	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.04				
CkD2:						
Clifton, moderately eroded	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.04				
CkE2:						
Clifton, moderately eroded	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.04				
CsB:						
Clifton, stony	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.08				
CsC:						
Clifton, stony	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.08				
CsD:						
Clifton, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.08				

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
CuB:						
Clifton	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.04				
Urban land	Not rated		Not rated		Not rated	
CuC:						
Clifton	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.04				
Urban land	Not rated		Not rated		Not rated	
CuD:						
Clifton	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.04				
Urban land	Not rated		Not rated		Not rated	
CxE:						
Craggey, windswept	Very limited		Very limited		Very limited	
	Large stones content	1.00	Slope	1.00	Slope	1.00
	Slope	1.00	Large stones content	1.00	Depth to bedrock	1.00
	Depth to bedrock	1.00			Droughty	0.99
	Gravel content	0.44				
Rock outcrop	Not rated		Not rated		Not rated	
Clingman, windswept	Not rated		Not rated		Not rated	
CxF:						
Craggey, windswept	Very limited		Very limited		Very limited	
	Large stones content	1.00	Slope	1.00	Slope	1.00
	Slope	1.00	Large stones content	1.00	Depth to bedrock	1.00
	Depth to bedrock	1.00			Droughty	0.99
	Gravel content	0.44				
Rock outcrop	Not rated		Not rated		Not rated	
Clingman, windswept	Very limited		Very limited		Very limited	
	Large stones content	1.00	Slope	1.00	Slope	1.00
	Slope	1.00	Organic matter content	1.00	Organic matter content	1.00
	Organic matter content	1.00	Large stones content	1.00	Depth to bedrock	1.00
	Depth to bedrock	1.00			Too acid	1.00
	Too acid	1.00				
DAM:						
Dam	Not rated		Not rated		Not rated	

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
DeA:						
Dellwood, occasionally flooded	Very limited		Not limited		Somewhat limited	
	Gravel content	1.00			Droughty	0.99
	Flooding	0.60			Flooding	0.60
					Gravel content	0.06
					Large stones content	0.03
Reddies, occasionally flooded	Somewhat limited		Not limited		Somewhat limited	
	Flooding	0.60			Flooding	0.60
	Gravel content	0.27			Droughty	0.01
DrB:						
Dillard, rarely flooded	Somewhat limited		Not limited		Not limited	
	Slope	0.12				
EdC:						
Edneyville, stony	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.59				
Chestnut, stony	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.99			Large stones content	0.20
	Depth to bedrock	0.06			Droughty	0.08
					Depth to bedrock	0.06
EdD:						
Edneyville, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.59				
Chestnut, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.99			Large stones content	0.20
	Depth to bedrock	0.06			Droughty	0.08
					Depth to bedrock	0.06
EdE:						
Edneyville, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.59				
Chestnut, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.99			Large stones content	0.20
	Depth to bedrock	0.06			Droughty	0.08
					Depth to bedrock	0.06
EdF:						
Edneyville, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.59				

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
EdF:						
Chestnut, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.99			Large stones content	0.20
	Depth to bedrock	0.06			Droughty	0.08
					Depth to bedrock	0.06
EvD2:						
Evard, moderately eroded	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.13				
Cowee, moderately eroded	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.13			Droughty	0.01
EvE2:						
Evard, moderately eroded	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.13				
Cowee, moderately eroded	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.13			Droughty	0.01
EvF2:						
Evard, moderately eroded	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.13				
Cowee, moderately eroded	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.13			Droughty	0.01
EwC:						
Evard, stony	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.72				
Cowee, stony	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.05			Depth to bedrock	0.01
	Depth to bedrock	0.01				
EwD:						
Evard, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.04				
Cowee, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.05			Depth to bedrock	0.01
	Depth to bedrock	0.01				

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EwE:						
Evard, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.47				
Cowee, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.05			Depth to bedrock	0.01
	Depth to bedrock	0.01				
EwF:						
Evard, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.04				
Cowee, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.01			Depth to bedrock	0.01
ExC:						
Evard	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.13				
Cowee	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Depth to bedrock	0.74
	Depth to bedrock	0.74			Slope	0.63
	Gravel content	0.13			Droughty	0.01
Urban land	Not rated		Not rated		Not rated	
ExD:						
Evard	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.13				
Cowee	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.13			Droughty	0.01
Urban land	Not rated		Not rated		Not rated	
ExE:						
Evard	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.13				
Cowee	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.13			Droughty	0.01
Urban land	Not rated		Not rated		Not rated	
FaC2:						
Fannin, moderately eroded	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.15			Large stones content	0.01

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
FaC2:						
Lauada, moderately eroded	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Depth to bedrock	0.16			Depth to bedrock	0.16
	Gravel content	0.15			Large stones content	0.01
FaD2:						
Fannin, moderately eroded	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.15			Large stones content	0.01
Lauada, moderately eroded	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.16			Depth to bedrock	0.16
	Gravel content	0.15			Large stones content	0.01
FaE2:						
Fannin, moderately eroded	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.15			Large stones content	0.01
Lauada, moderately eroded	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.16			Depth to bedrock	0.16
	Gravel content	0.15			Large stones content	0.01
FnB:						
Fannin, moderately eroded	Somewhat limited		Not limited		Somewhat limited	
	Slope	0.88			Large stones content	0.01
	Gravel content	0.15				
Lauada, moderately eroded	Somewhat limited		Not limited		Somewhat limited	
	Slope	0.88			Depth to bedrock	0.16
	Depth to bedrock	0.16			Large stones content	0.01
	Gravel content	0.15				
Urban land	Not rated		Not rated		Not rated	
FnC:						
Fannin, moderately eroded	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.15			Large stones content	0.01

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
FnC:						
Lauada, moderately eroded	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Depth to bedrock	0.16			Depth to bedrock	0.16
	Gravel content	0.15			Large stones content	0.01
Urban land	Not rated		Not rated		Not rated	
FnD:						
Fannin, moderately eroded	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.15			Large stones content	0.01
Lauada, moderately eroded	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.16			Depth to bedrock	0.16
	Gravel content	0.15			Large stones content	0.01
Urban land	Not rated		Not rated		Not rated	
FrA:						
French, occasionally flooded	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.81	Depth to saturated zone	0.11	Flooding	0.60
	Flooding	0.60			Depth to saturated zone	0.48
					Large stones content	0.01
HcE:						
Heintooga, very stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.99	Large stones content	0.99	Large stones content	1.00
	Gravel content	0.03			Droughty	0.75
Chiltoskie, very stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Large stones content	0.01
HpA:						
Hemphill, rarely flooded	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
	Slow water movement	0.96				

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
IoA:						
Iotla, occasionally flooded	Somewhat limited		Somewhat limited		Somewhat limited	
	Depth to saturated zone	0.77	Depth to saturated zone	0.08	Flooding	0.60
	Flooding	0.60			Depth to saturated zone	0.43
	Gravel content	0.18				
JbB:						
Junaluska	Somewhat limited		Not limited		Somewhat limited	
	Slope	0.88			Large stones content	0.84
	Gravel content	0.19			Depth to bedrock	0.06
	Depth to bedrock	0.06				
Brasstown	Somewhat limited		Not limited		Somewhat limited	
	Slope	0.88			Large stones content	0.03
JbC:						
Junaluska	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Large stones content	0.84
	Gravel content	0.19			Slope	0.63
	Depth to bedrock	0.06			Depth to bedrock	0.06
Brasstown	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
					Large stones content	0.03
JbD:						
Junaluska	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.80			Depth to bedrock	0.80
Brasstown	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
					Large stones content	0.03
JbE:						
Junaluska	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.80			Depth to bedrock	0.80
Brasstown	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.03
KsB:						
Kanuga	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Slow water movement	0.26				

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
KsB:						
Swannanoa	Somewhat limited		Somewhat limited		Somewhat limited	
	Slope	0.88	Depth to saturated zone	0.08	Depth to saturated zone	0.43
	Depth to saturated zone	0.77				
	Slow water movement	0.26				
	Gravel content	0.02				
KsC:						
Kanuga	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.37
	Slow water movement	0.26				
Swannanoa	Very limited		Somewhat limited		Somewhat limited	
	Slope	1.00	Depth to saturated zone	0.08	Depth to saturated zone	0.43
	Depth to saturated zone	0.77			Slope	0.37
	Slow water movement	0.26				
	Gravel content	0.02				
MvD:						
Mars Hill, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.04	Too sandy	0.01		
	Too sandy	0.01				
Walnut, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.04			Droughty	0.07
MvE:						
Mars Hill, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.04	Too sandy	0.01		
	Too sandy	0.01				
Walnut, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.04			Droughty	0.08
MvF:						
Mars Hill, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.04	Too sandy	0.01		
	Too sandy	0.01				
Walnut, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.04			Droughty	0.07

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Value	Paths and trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
MwD:						
Micaville, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	1.00			Gravel content	0.25
					Large stones content	0.01
Brownwood, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.71			Depth to bedrock	0.71
	Gravel content	0.47			Droughty	0.19
MwE:						
Micaville, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	1.00			Gravel content	0.25
					Large stones content	0.01
Brownwood, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.71			Depth to bedrock	0.71
	Gravel content	0.47			Droughty	0.19
MwF:						
Micaville, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	1.00			Gravel content	0.25
					Large stones content	0.01
Brownwood, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.71			Depth to bedrock	0.71
	Gravel content	0.47			Droughty	0.19
NkA:						
Nikwasi, frequently flooded	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Ponding	1.00
	Flooding	1.00	Ponding	1.00	Flooding	1.00
	Ponding	1.00	Flooding	0.40	Depth to saturated zone	1.00
	Gravel content	0.27				
NtD:						
Northcove, very stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.76	Large stones content	0.53	Large stones content	1.00
	Large stones content	0.53			Droughty	0.09

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds		Paths and trails		Golf fairways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
NtD:						
Maymead, very stony-----	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Large stones content	0.53	Large stones content	0.53		
	Gravel content	0.04				
NtE:						
Northcove, very stony---	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.76	Large stones content	0.53	Large stones content	1.00
	Large stones content	0.53			Droughty	0.09
Maymead, very stony-----	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53		
	Gravel content	0.04				
OwC:						
Oconaluftee, windswept--	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Large stones content	0.46
	Gravel content	1.00			Slope	0.37
					Gravel content	0.21
Guyot, windswept--------	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.37
					Large stones content	0.01
Cataloochee, windswept--	Very limited		Not limited		Very limited	
	Slope	1.00			Too acid	1.00
	Too acid	1.00			Slope	0.37
	Depth to bedrock	0.35			Depth to bedrock	0.35
	Gravel content	0.01			Large stones content	0.11
OwD:						
Oconaluftee, windswept--	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	1.00			Large stones content	0.46
					Gravel content	0.21
Guyot, windswept--------	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
					Large stones content	0.01
Cataloochee, windswept--	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Too acid	1.00			Too acid	1.00
	Depth to bedrock	0.35			Depth to bedrock	0.35
	Gravel content	0.01			Large stones content	0.11

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
OwE:						
Oconaluftee, windswept--	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	1.00			Large stones content	0.46
					Gravel content	0.21
Guyot, windswept--------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.01
Cataloochee, windswept--	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Too acid	1.00			Too acid	1.00
	Depth to bedrock	0.35			Depth to bedrock	0.35
	Gravel content	0.01			Large stones content	0.11
OwF:						
Oconaluftee, windswept--	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	1.00			Large stones content	0.46
					Gravel content	0.21
Guyot, windswept--------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
					Large stones content	0.01
Cataloochee, windswept--	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Too acid	1.00			Too acid	1.00
	Depth to bedrock	0.35			Depth to bedrock	0.35
	Gravel content	0.01			Large stones content	0.11
Pg:						
Pits, gravel------------	Not rated		Not rated		Not rated	
Pt:						
Pits, quarry------------	Not rated		Not rated		Not rated	
PwC:						
Porters, stony----------	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.56				
Unaka, stony------------	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Depth to bedrock	0.71
	Depth to bedrock	0.71			Slope	0.63
	Gravel content	0.22				
PwD:						
Porters, stony----------	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.56				

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
PwD:						
Unaka, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.71			Depth to bedrock	0.71
	Gravel content	0.22				
PwE:						
Porters, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.56				
Unaka, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.71			Depth to bedrock	0.71
	Gravel content	0.22				
PxF:						
Porters, rocky	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.56				
Unaka, rocky	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.71			Depth to bedrock	0.71
	Gravel content	0.22				
RdA:						
Reddies, occasionally flooded	Somewhat limited		Not limited		Somewhat limited	
	Flooding	0.60			Flooding	0.60
	Gravel content	0.27			Droughty	0.01
RkF:						
Rock outcrop	Not rated		Not rated		Not rated	
Cleveland, very bouldery	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.53	Droughty	1.00
	Gravel content	0.56			Depth to bedrock	1.00
	Large stones content	0.53				
RoF:						
Rock outcrop	Not rated		Not rated		Not rated	
Oteen, very bouldery	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00	Large stones content	0.47	Depth to bedrock	1.00
	Large stones content	0.47			Droughty	1.00
	Gravel content	0.04				
RsA:						
Rosman, occasionally flooded	Somewhat limited		Not limited		Somewhat limited	
	Flooding	0.60			Flooding	0.60

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Value	Paths and trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
SoD:						
Soco, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Slow water movement	0.26			Depth to bedrock	0.10
	Depth to bedrock	0.10				
Stecoah, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
SoE:						
Soco, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Slow water movement	0.26			Depth to bedrock	0.10
	Depth to bedrock	0.10				
Stecoah, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
SoF:						
Soco, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Slow water movement	0.26			Depth to bedrock	0.10
	Depth to bedrock	0.10				
Stecoah, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
StB:						
Statler, rarely flooded	Somewhat limited		Not limited		Not limited	
	Gravel content	0.32				
	Slope	0.12				
SyD:						
Sylco, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.99			Depth to bedrock	0.95
	Depth to bedrock	0.95			Droughty	0.41
					Large stones content	0.20
Soco, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.22			Large stones content	0.92
	Depth to bedrock	0.10			Depth to bedrock	0.10
SyE:						
Sylco, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.99			Depth to bedrock	0.95
	Depth to bedrock	0.95			Droughty	0.41
					Large stones content	0.20

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Value	Paths and trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
SyE:						
Soco, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.22			Large stones content	0.92
	Depth to bedrock	0.10			Depth to bedrock	0.10
SzF:						
Sylco, very stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.99	Large stones content	0.53	Depth to bedrock	0.95
	Depth to bedrock	0.95			Droughty	0.41
	Large stones content	0.53			Large stones content	0.20
Soco, very stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.53	Large stones content	0.53	Large stones content	0.92
	Gravel content	0.22			Depth to bedrock	0.10
	Depth to bedrock	0.10				
TaB:						
Tate	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.04				
TaC:						
Tate	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.04				
TaD:						
Tate	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.04				
TkC:						
Tate, very stony	Very limited		Somewhat limited		Somewhat limited	
	Slope	1.00	Large stones content	0.53	Slope	0.63
	Large stones content	0.53				
	Gravel content	0.04				
TkD:						
Tate, very stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Large stones content	0.53	Large stones content	0.53		
	Gravel content	0.04				
TmB:						
Tate	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.04				
Urban land	Not rated		Not rated		Not rated	

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Value	Paths and trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
TmC:						
Tate	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.04				
Urban land	Not rated		Not rated		Not rated	
TmD:						
Tate	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.04				
Urban land	Not rated		Not rated		Not rated	
TnE:						
Toecane, extremely bouldery	Very limited		Very limited		Very limited	
	Large stones content	1.00	Slope	1.00	Slope	1.00
	Slope	1.00	Large stones content	1.00	Large stones content	1.00
	Gravel content	0.62	Large stones content	0.68	Droughty	0.07
ToC:						
Toecane, bouldery	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Large stones content	0.88
	Gravel content	0.02			Slope	0.63
					Droughty	0.07
Tusquitee, bouldery	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.52			Large stones content	0.01
TpD:						
Toecane, very bouldery	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Large stones content	0.47	Large stones content	0.47	Large stones content	0.88
	Gravel content	0.02			Droughty	0.07
Tusquitee, very bouldery	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	1.00	Large stones content	0.47	Large stones content	0.20
	Large stones content	0.47			Gravel content	0.07
TpE:						
Toecane, very bouldery	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Large stones content	0.47	Large stones content	0.47	Large stones content	0.88
	Gravel content	0.02			Droughty	0.07
Tusquitee, very bouldery	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	1.00	Large stones content	0.47	Large stones content	0.20
	Large stones content	0.47			Gravel content	0.07

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
TsA:						
Toxaway, frequently flooded	Very limited		Very limited		Very limited	
	Depth to saturated zone	1.00	Depth to saturated zone	1.00	Flooding	1.00
	Flooding	1.00	Flooding	0.40	Depth to saturated zone	1.00
TtE:						
Trimont, stony	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	1.00			Large stones content	0.11
					Gravel content	0.05
TuD:						
Tusquitee, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	1.00			Large stones content	0.20
					Gravel content	0.07
Toecane, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.31	Large stones content	0.03	Large stones content	1.00
	Large stones content	0.03			Droughty	0.07
TwB:						
Tusquitee	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.04				
Whiteside	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.37				
TwC:						
Tusquitee	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.04				
Whiteside	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.37				
UcB:						
Udifluvents, frequently flooded	Very limited		Very limited		Very limited	
	Too sandy	1.00	Too sandy	1.00	Flooding	1.00
	Flooding	1.00	Flooding	0.40	Too sandy	0.50
	Slope	0.12			Droughty	0.34
	Gravel content	0.01				

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
Ud:						
Udorthents, loamy	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.01
	Slow water movement	0.15				
UfB:						
Udorthents, occasionally flooded	Somewhat limited		Not limited		Somewhat limited	
	Flooding	0.60			Flooding	0.60
	Slope	0.12				
Urban land, occasionally flooded	Not rated		Not rated		Not rated	
UhE:						
Udorthents, rocky	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
Urban land	Not rated		Not rated		Not rated	
UkD:						
Unaka, very bouldery	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.71	Large stones content	0.47	Depth to bedrock	0.71
	Large stones content	0.47				
	Gravel content	0.22				
Rock outcrop	Not rated		Not rated		Not rated	
UkE:						
Unaka, very bouldery	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.71	Large stones content	0.47	Depth to bedrock	0.71
	Large stones content	0.47				
	Gravel content	0.22				
Rock outcrop	Not rated		Not rated		Not rated	
UkF:						
Unaka, very bouldery	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.71	Large stones content	0.47	Depth to bedrock	0.71
	Large stones content	0.47				
	Gravel content	0.22				
Rock outcrop	Not rated		Not rated		Not rated	
UnB:						
Unison	Somewhat limited		Not limited		Somewhat limited	
	Slope	0.88			Large stones content	0.01
UnC:						
Unison	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
					Large stones content	0.01

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Value	Paths and trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
UnD:						
Unison------------------	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
					Large stones content	0.01
UrB:						
Unison------------------	Somewhat limited		Not limited		Somewhat limited	
	Slope	0.88			Large stones content	0.01
Urban land--------------	Not rated		Not rated		Not rated	
UrC:						
Unison------------------	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
					Large stones content	0.01
Urban land--------------	Not rated		Not rated		Not rated	
Ux:						
Urban land--------------	Not rated		Not rated		Not rated	
W:						
Water-------------------	Not rated		Not rated		Not rated	
WaC2:						
Walnut, moderately eroded-----------------	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Depth to bedrock	0.74
	Depth to bedrock	0.74			Slope	0.63
	Gravel content	0.04			Droughty	0.21
Oteen, moderately eroded	Very limited		Not limited		Very limited	
	Slope	1.00			Depth to bedrock	1.00
	Depth to bedrock	1.00			Droughty	1.00
	Gravel content	0.04			Slope	0.63
Mars Hill, moderately eroded-----------------	Very limited		Somewhat limited		Somewhat limited	
	Slope	1.00	Too sandy	0.01	Slope	0.63
	Gravel content	0.04				
	Too sandy	0.01				
WaD2:						
Walnut, moderately eroded-----------------	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.04			Droughty	0.21
Oteen, moderately eroded	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	1.00			Depth to bedrock	1.00
	Gravel content	0.04			Droughty	1.00

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
WaD2:						
Mars Hill, moderately eroded	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.04	Too sandy	0.01		
	Too sandy	0.01				
WaE2:						
Walnut, moderately eroded	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.04			Droughty	0.21
Oteen, moderately eroded	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00			Depth to bedrock	1.00
	Gravel content	0.04			Droughty	1.00
Mars Hill, moderately eroded	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.04	Too sandy	0.01		
	Too sandy	0.01				
WnF:						
Walnut	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.74			Depth to bedrock	0.74
	Gravel content	0.04			Droughty	0.08
Oteen	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	1.00			Depth to bedrock	1.00
	Gravel content	0.04			Droughty	1.00
Rock outcrop	Not rated		Not rated		Not rated	
WoE:						
Wayah, bouldery	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.66			Large stones content	0.01
Burton, bouldery	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.84	Large stones content	0.03	Large stones content	1.00
	Gravel content	0.78			Depth to bedrock	0.84
	Large stones content	0.03			Droughty	0.51
WpF:						
Wayah, very rocky	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.66	Large stones content	0.53	Large stones content	0.01
	Large stones content	0.53				

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
WpF:						
Burton, very rocky------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.84	Large stones content	0.53	Large stones content	1.00
	Gravel content	0.78			Depth to bedrock	0.84
	Large stones content	0.53			Droughty	0.51
WrC:						
Wayah, windswept--------	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.66			Large stones content	0.01
Burton, windswept-------	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Depth to bedrock	0.90
	Depth to bedrock	0.90			Slope	0.63
					Large stones content	0.26
WrD:						
Wayah, windswept--------	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Gravel content	0.66			Large stones content	0.01
Burton, windswept-------	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Depth to bedrock	0.90			Depth to bedrock	0.90
					Large stones content	0.26
WrE:						
Wayah, windswept--------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.66			Large stones content	0.01
Burton, windswept-------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.90			Depth to bedrock	0.90
					Large stones content	0.26
WsF:						
Wayah, windswept--------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Gravel content	0.66			Large stones content	0.01
Burton, windswept-------	Very limited		Very limited		Very limited	
	Slope	1.00	Slope	1.00	Slope	1.00
	Depth to bedrock	0.84			Depth to bedrock	0.84
					Large stones content	0.26
WtB:						
Whiteside---------------	Somewhat limited		Not limited		Not limited	
	Slope	0.88				
	Gravel content	0.27				

Table 10.—Recreational Development, Part II—Continued

Map symbol and soil name	Playgrounds: Rating class and limiting features	Playgrounds: Value	Paths and trails: Rating class and limiting features	Paths and trails: Value	Golf fairways: Rating class and limiting features	Golf fairways: Value
WtC:						
Whiteside	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Gravel content	0.27				
ZcB:						
Zillicoa	Somewhat limited		Not limited		Somewhat limited	
	Slow water movement	0.96			Large stones content	0.01
	Slope	0.88				
ZcC:						
Zillicoa	Very limited		Not limited		Somewhat limited	
	Slope	1.00			Slope	0.63
	Slow water movement	0.96			Large stones content	0.01
ZoD:						
Zillicoa, stony	Very limited		Somewhat limited		Very limited	
	Slope	1.00	Slope	0.92	Slope	1.00
	Slow water movement	0.96			Large stones content	0.01

Table 11.—Building Site Development, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
AcD:							
Ashe, very stony----	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to hard bedrock	0.46
Cleveland, very stony--------------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Rock outcrop--------	20	Not rated		Not rated		Not rated	
ArE:							
Ashe, very bouldery-	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to hard bedrock	0.46
Cleveland, very bouldery-----------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Rock outcrop--------	20	Not rated		Not rated		Not rated	
ArF:							
Ashe, very bouldery-	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.46	Depth to hard bedrock	1.00	Depth to hard bedrock	0.46
Cleveland, very bouldery-----------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Rock outcrop--------	20	Not rated		Not rated		Not rated	
BaD:							
Balsam, extremely bouldery-----------	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
Tanasee, extremely bouldery-----------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
BaE:							
Balsam, extremely bouldery	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
Tanasee, extremely bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
BeA:							
Biltmore, occasionally flooded	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.24		
BkB2:							
Braddock, moderately eroded	80	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
						Slope	0.12
BkC2:							
Braddock, moderately eroded	80	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
BkD2:							
Braddock, moderately eroded	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
BnB:							
Braddock	40	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	0.50
						Shrink-swell	0.50
Urban land	30	Not rated		Not rated		Not rated	
BnC:							
Braddock	40	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Urban land	30	Not rated		Not rated		Not rated	
BpF:							
Breakneck, windswept	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.64	Depth to hard bedrock	1.00	Depth to hard bedrock	0.64
Pullback, windswept	30	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Slope	0.50	Slope	0.50	Depth to hard bedrock	1.00

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
BwD:							
Burton, windswept---	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.54	Depth to hard bedrock	1.00	Depth to hard bedrock	0.54
Craggey, windswept--	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
BxE:							
Burton, windswept---	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.54	Depth to hard bedrock	1.00	Depth to hard bedrock	0.54
Craggey, windswept--	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Rock outcrop--------	20	Not rated		Not rated		Not rated	
BxF:							
Burton, windswept---	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.54	Depth to hard bedrock	1.00	Depth to hard bedrock	0.54
Craggey, windswept--	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Rock outcrop--------	20	Not rated		Not rated		Not rated	
CaE:							
Cataska, very rocky-	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Depth to hard bedrock	1.00	Depth to soft bedrock	1.00
		Depth to hard bedrock	0.64	Depth to soft bedrock	1.00	Large stones content	1.00
		Depth to soft bedrock	0.50	Large stones content	1.00	Depth to hard bedrock	0.64
Sylco, very rocky---	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Depth to hard bedrock	1.00	Large stones content	1.00
		Depth to hard bedrock	0.46	Large stones content	1.00	Depth to hard bedrock	0.46

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
CdF:							
Cataska, very stony-	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.64	Depth to hard bedrock	1.00	Depth to soft bedrock	1.00
		Large stones content	0.54	Depth to soft bedrock	1.00	Depth to hard bedrock	0.64
		Depth to soft bedrock	0.50	Large stones content	0.54	Large stones content	0.54
Sylco, very stony---	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	0.99	Depth to hard bedrock	1.00	Large stones content	0.99
		Depth to hard bedrock	0.95	Large stones content	0.99	Depth to hard bedrock	0.95
Rock outcrop--------	20	Not rated		Not rated		Not rated	
ChD:							
Cheoah, stony-------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Jeffrey, stony------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to hard bedrock	0.35
ChE:							
Cheoah, stony-------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Jeffrey, stony------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to hard bedrock	0.35
ChF:							
Cheoah, stony-------	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Jeffrey, stony------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to hard bedrock	0.35
CkB2:							
Clifton, moderately eroded------------	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
						Slope	0.12
CkC2:							
Clifton, moderately eroded------------	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
CkD2:							
Clifton, moderately eroded	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
CkE2:							
Clifton, moderately eroded	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
CsB:							
Clifton, stony	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
						Slope	0.12
CsC:							
Clifton, stony	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
CsD:							
Clifton, stony	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
CuB:							
Clifton	50	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
						Slope	0.12
Urban land	40	Not rated		Not rated		Not rated	
CuC:							
Clifton	50	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Urban land	40	Not rated		Not rated		Not rated	
CuD:							
Clifton	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Urban land	40	Not rated		Not rated		Not rated	
CxE:							
Craggey, windswept	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Rock outcrop	20	Not rated		Not rated		Not rated	

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
CxE:							
Clingman, windswept-	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Organic matter content	1.00	Depth to hard bedrock	1.00	Organic matter content	1.00
		Depth to hard bedrock	1.00			Depth to hard bedrock	1.00
CxF:							
Craggey, windswept--	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Rock outcrop--------	20	Not rated		Not rated		Not rated	
Clingman, windswept-	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Organic matter content	1.00	Depth to hard bedrock	1.00	Organic matter content	1.00
		Depth to hard bedrock	1.00			Depth to hard bedrock	1.00
DAM:							
Dam-----------------	100	Not rated		Not rated		Not rated	
DeA:							
Dellwood, occasionally flooded------------	60	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Large stones content	0.02	Depth to saturated zone	0.95	Large stones content	0.02
				Large stones content	0.02		
Reddies, occasionally flooded------------	30	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.99		
DrB:							
Dillard, rarely flooded------------	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.99		
EdC:							
Edneyville, stony---	55	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
Chestnut, stony-----	25	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
				Depth to soft bedrock	0.06		

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
EdD:							
Edneyville, stony---	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Chestnut, stony-----	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.06		
EdE:							
Edneyville, stony---	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Chestnut, stony-----	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.06		
EdF:							
Edneyville, stony---	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Chestnut, stony-----	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.06		
EvD2:							
Evard, moderately eroded-------------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee, moderately eroded-------------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.74		
EvE2:							
Evard, moderately eroded-------------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee, moderately eroded-------------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.74		
EvF2:							
Evard, moderately eroded-------------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee, moderately eroded-------------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.74		

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
EwC:							
Evard, stony--------	55	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
Cowee, stony--------	25	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
				Depth to soft bedrock	0.01		
EwD:							
Evard, stony--------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee, stony--------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.01		
EwE:							
Evard, stony--------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee, stony--------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.01		
EwF:							
Evard, stony--------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee, stony--------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.01		
ExC:							
Evard---------------	40	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
Cowee---------------	25	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Depth to soft bedrock	0.74	Slope	1.00
				Slope	0.63		
Urban land----------	20	Not rated		Not rated		Not rated	
ExD:							
Evard---------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee---------------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.74		
Urban land----------	20	Not rated		Not rated		Not rated	
ExE:							
Evard---------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
ExE:							
Cowee	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.74		
Urban land	20	Not rated		Not rated		Not rated	
FaC2:							
Fannin, moderately eroded	55	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
Lauada, moderately eroded	25	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
				Depth to soft bedrock	0.15		
FaD2:							
Fannin, moderately eroded	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Lauada, moderately eroded	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.15		
FaE2:							
Fannin, moderately eroded	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Lauada, moderately eroded	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.15		
FnB:							
Fannin, moderately eroded	40	Not limited		Not limited		Somewhat limited	
						Slope	0.12
Lauada, moderately eroded	25	Not limited		Somewhat limited		Somewhat limited	
				Depth to soft bedrock	0.15	Slope	0.12
Urban land	20	Not rated		Not rated		Not rated	
FnC:							
Fannin, moderately eroded	40	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
FnC:							
Lauada, moderately eroded	25	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
				Depth to soft bedrock	0.15		
Urban land	20	Not rated		Not rated		Not rated	
FnD:							
Fannin, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Lauada, moderately eroded	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.15		
Urban land	20	Not rated		Not rated		Not rated	
FrA:							
French, occasionally flooded	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.81	Depth to saturated zone	1.00	Depth to saturated zone	0.81
HcE:							
Heintooga, very stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
Chiltoskie, very stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
HpA:							
Hemphill, rarely flooded	75	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
IoA:							
Iotla, occasionally flooded	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.77	Depth to saturated zone	1.00	Depth to saturated zone	0.77

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
JbB:							
Junaluska-----------	50	Not limited		Somewhat limited		Somewhat limited	
				Depth to soft bedrock	0.06	Slope	0.12
Brasstown-----------	40	Not limited		Not limited		Somewhat limited	
						Slope	0.12
JbC:							
Junaluska-----------	50	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
				Depth to soft bedrock	0.06		
Brasstown-----------	40	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
JbD:							
Junaluska-----------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.79		
Brasstown-----------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
JbE:							
Junaluska-----------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.79		
Brasstown-----------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
KsB:							
Kanuga--------------	50	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Depth to saturated zone	0.99	Shrink-swell	0.50
						Slope	0.12
				Shrink-swell	0.50		
Swannanoa-----------	35	Somewhat limited		Very limited		Somewhat limited	
		Depth to saturated zone	0.77	Depth to saturated zone	1.00	Depth to saturated zone	0.77
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
						Slope	0.12
KsC:							
Kanuga--------------	50	Somewhat limited		Somewhat limited		Very limited	
		Shrink-swell	0.50	Depth to saturated zone	0.99	Slope	1.00
		Slope	0.37			Shrink-swell	0.50
				Shrink-swell	0.50		
				Slope	0.37		
Swannanoa-----------	35	Somewhat limited		Very limited		Very limited	
		Depth to saturated zone	0.77	Depth to saturated zone	1.00	Slope	1.00
						Depth to saturated zone	0.77
		Shrink-swell	0.50	Shrink-swell	0.50		
		Slope	0.37	Slope	0.37	Shrink-swell	0.50

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
MvD:							
Mars Hill, stony----	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Walnut, stony-------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.74		
MvE:							
Mars Hill, stony----	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Walnut, stony-------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.74		
MvF:							
Mars Hill, stony----	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Walnut, stony-------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.74		
MwD:							
Micaville, stony----	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Brownwood, stony----	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.71		
MwE:							
Micaville, stony----	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Brownwood, stony----	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.71		
MwF:							
Micaville, stony----	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Brownwood, stony----	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.71		
NkA:							
Nikwasi, frequently flooded------------	70	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
NtD:							
Northcove, very stony	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
Maymead, very stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
NtE:							
Northcove, very stony	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
Maymead, very stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
OwC:							
Oconaluftee, windswept	45	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Slope	0.37	Slope	1.00
Guyot, windswept	25	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Slope	0.37	Slope	1.00
Cataloochee, windswept	20	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.37	Slope	0.37	Slope	1.00
				Depth to soft bedrock	0.35		
OwD:							
Oconaluftee, windswept	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Guyot, windswept	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cataloochee, windswept	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.35		
OwE:							
Oconaluftee, windswept	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
OwE:							
Guyot, windswept----	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cataloochee, windswept----------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.35		
OwF:							
Oconaluftee, windswept----------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Guyot, windswept----	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cataloochee, windswept----------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.35		
Pg:							
Pits, gravel--------	100	Not rated		Not rated		Not rated	
Pt:							
Pits, quarry--------	90	Not rated		Not rated		Not rated	
PwC:							
Porters, stony------	45	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
				Depth to hard bedrock	0.13		
Unaka, stony--------	40	Somewhat limited		Very limited		Very limited	
		Slope	0.63	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.35	Depth to soft bedrock	0.71	Depth to hard bedrock	0.35
				Slope	0.63		
PwD:							
Porters, stony------	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to hard bedrock	0.13		
Unaka, stony--------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to hard bedrock	0.35
				Depth to soft bedrock	0.71		
PwE:							
Porters, stony------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to hard bedrock	0.13		

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
PwE:							
Unaka, stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to hard bedrock	0.35
				Depth to soft bedrock	0.71		
PxF:							
Porters, rocky	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to hard bedrock	0.13		
Unaka, rocky	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to hard bedrock	0.35
				Depth to soft bedrock	0.71		
RdA:							
Reddies, occasionally flooded	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.99		
RkF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Cleveland, very bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
RoF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Oteen, very bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
RsA:							
Rosman, occasionally flooded	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.47		
SoD:							
Soco, stony	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.10		
Stecoah, stony	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
SoE:							
Soco, stony	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.10		
Stecoah, stony	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
SoF:							
Soco, stony	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.10		
Stecoah, stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
StB:							
Statler, rarely flooded	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.16		
SyD:							
Sylco, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.95	Depth to hard bedrock	1.00	Depth to hard bedrock	0.95
Soco, stony	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.10		
SyE:							
Sylco, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.95	Depth to hard bedrock	1.00	Depth to hard bedrock	0.95
Soco, stony	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.10		
SzF:							
Sylco, very stony	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.95	Depth to hard bedrock	1.00	Depth to hard bedrock	0.95
Soco, very stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.10		
TaB:							
Tate	85	Not limited		Not limited		Somewhat limited	
						Slope	0.12

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
TaC:							
Tate----------------	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
TaD:							
Tate----------------	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
TkC:							
Tate, very stony----	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
TkD:							
Tate, very stony----	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
TmB:							
Tate----------------	50	Not limited		Not limited		Somewhat limited	
						Slope	0.12
Urban land----------	40	Not rated		Not rated		Not rated	
TmC:							
Tate----------------	50	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
Urban land----------	40	Not rated		Not rated		Not rated	
TmD:							
Tate----------------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Urban land----------	40	Not rated		Not rated		Not rated	
TnE:							
Toecane, extremely bouldery-----------	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
ToC:							
Toecane, bouldery---	50	Somewhat limited		Somewhat limited		Very limited	
		Large stones content	0.83	Large stones content	0.83	Slope	1.00
		Slope	0.63	Slope	0.63	Large stones content	0.83
Tusquitee, bouldery-	40	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
TpD:							
Toecane, very bouldery-----------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	0.83	Large stones content	0.83	Large stones content	0.83
Tusquitee, very bouldery-----------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
TpE:							
Toecane, very bouldery-----------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	0.83	Large stones content	0.83	Large stones content	0.83
Tusquitee, very bouldery-----------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
TsA:							
Toxaway, frequently flooded------------	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
TtE:							
Trimont, stony------	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
TuD:							
Tusquitee, stony----	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Toecane, stony------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
TwB:							
Tusquitee-----------	55	Not limited		Not limited		Somewhat limited	
						Slope	0.12
Whiteside-----------	35	Not limited		Somewhat limited		Somewhat limited	
				Depth to saturated zone	0.99	Slope	0.12
TwC:							
Tusquitee-----------	55	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
Whiteside-----------	35	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Depth to saturated zone	0.99	Slope	1.00
				Slope	0.63		
UcB:							
Udifluvents, frequently flooded-	95	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.47		

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
Ud:							
Udorthents, loamy---	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.01	Slope	0.01	Slope	1.00
UfB:							
Udorthents, occasionally flooded-----------	60	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Urban land, occasionally flooded-----------	30	Not rated		Not rated		Not rated	
UhE:							
Udorthents, rocky---	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Urban land----------	40	Not rated		Not rated		Not rated	
UkD:							
Unaka, very bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to hard bedrock	0.35
				Depth to soft bedrock	0.71		
Rock outcrop--------	35	Not rated		Not rated		Not rated	
UkE:							
Unaka, very bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to hard bedrock	0.35
				Depth to soft bedrock	0.71		
Rock outcrop--------	35	Not rated		Not rated		Not rated	
UkF:							
Unaka, very bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.35	Depth to hard bedrock	1.00	Depth to hard bedrock	0.35
				Depth to soft bedrock	0.71		
Rock outcrop--------	35	Not rated		Not rated		Not rated	
UnB:							
Unison--------------	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
						Slope	0.12
UnC:							
Unison--------------	80	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
UnD:							
Unison	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
UrB:							
Unison	60	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
						Slope	0.12
Urban land	30	Not rated		Not rated		Not rated	
UrC:							
Unison	60	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Urban land	30	Not rated		Not rated		Not rated	
Ux:							
Urban land	90	Not rated		Not rated		Not rated	
W:							
Water	100	Not rated		Not rated		Not rated	
WaC2:							
Walnut, moderately eroded	40	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Depth to soft bedrock	0.74	Slope	1.00
				Slope	0.63		
Oteen, moderately eroded	35	Somewhat limited		Very limited		Very limited	
		Slope	0.63	Depth to soft bedrock	1.00	Slope	1.00
		Depth to soft bedrock	0.50	Slope	0.63	Depth to soft bedrock	1.00
Mars Hill, moderately eroded	20	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
WaD2:							
Walnut, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.74		
Oteen, moderately eroded	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
Mars Hill, moderately eroded	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
WaE2:							
Walnut, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.74		
Oteen, moderately eroded	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
Mars Hill, moderately eroded	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
WnF:							
Walnut	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.74		
Oteen	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Depth to soft bedrock	1.00
Rock outcrop	20	Not rated		Not rated		Not rated	
WoE:							
Wayah, bouldery	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Burton, bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.84	Depth to hard bedrock	1.00	Depth to hard bedrock	0.84
WpF:							
Wayah, very rocky	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Burton, very rocky	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.84	Depth to hard bedrock	1.00	Depth to hard bedrock	0.84
WrC:							
Wayah, windswept	50	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
Burton, windswept	40	Somewhat limited		Very limited		Very limited	
		Depth to hard bedrock	0.71	Depth to hard bedrock	1.00	Slope	1.00
		Slope	0.63	Depth to soft bedrock	0.90	Depth to hard bedrock	0.71
				Slope	0.63		

Table 11.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
WrD:							
Wayah, windswept----	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Burton, windswept---	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.71	Depth to hard bedrock	1.00	Depth to hard bedrock	0.71
				Depth to soft bedrock	0.90		
WrE:							
Wayah, windswept----	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Burton, windswept---	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.71	Depth to hard bedrock	1.00	Depth to hard bedrock	0.71
				Depth to soft bedrock	0.90		
WsF:							
Wayah, windswept----	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Burton, windswept---	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.84	Depth to hard bedrock	1.00	Depth to hard bedrock	0.84
WtB:							
Whiteside-----------	90	Not limited		Somewhat limited		Somewhat limited	
				Depth to saturated zone	0.99	Slope	0.12
WtC:							
Whiteside-----------	90	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Depth to saturated zone	0.99	Slope	1.00
				Slope	0.63		
ZcB:							
Zillicoa------------	85	Not limited		Not limited		Somewhat limited	
						Slope	0.12
ZcC:							
Zillicoa------------	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
ZoD:							
Zillicoa, stony-----	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00

Table 11.—Building Site Development, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
AcD:							
Ashe, very stony	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50	Slope	1.00	Depth to bedrock	0.46
		Depth to hard bedrock	0.46	Cutbanks cave	1.00	Droughty	0.04
Cleveland, very stony	30	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Droughty	1.00
		Frost action	0.50	Cutbanks cave	0.10	Depth to bedrock	1.00
Rock outcrop	20	Not rated		Not rated		Not rated	
ArE:							
Ashe, very bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50	Slope	1.00	Depth to bedrock	0.46
		Depth to hard bedrock	0.46	Cutbanks cave	1.00	Droughty	0.04
Cleveland, very bouldery	30	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Droughty	1.00
		Frost action	0.50	Cutbanks cave	0.10	Depth to bedrock	1.00
Rock outcrop	20	Not rated		Not rated		Not rated	
ArF:							
Ashe, very bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50	Slope	1.00	Depth to bedrock	0.46
		Depth to hard bedrock	0.46	Cutbanks cave	1.00	Droughty	0.04
Cleveland, very bouldery	30	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Droughty	1.00
		Frost action	0.50	Cutbanks cave	0.10	Depth to bedrock	1.00
Rock outcrop	20	Not rated		Not rated		Not rated	
BaD:							
Balsam, extremely bouldery	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
		Frost action	0.50	Cutbanks cave	0.10		

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
BaD:							
Tanasee, extremely bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Large stones content	0.01
BaE:							
Balsam, extremely bouldery	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Tanasee, extremely bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Large stones content	0.01
BeA:							
Biltmore, occasionally flooded	90	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	0.60
				Flooding	0.60	Droughty	0.09
				Depth to saturated zone	0.24		
BkB2:							
Braddock, moderately eroded	80	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
BkC2:							
Braddock, moderately eroded	80	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
BkD2:							
Braddock, moderately eroded	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
BnB:							
Braddock	40	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Urban land	30	Not rated		Not rated		Not rated	

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
BnC:							
Braddock------------	40	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Urban land----------	30	Not rated		Not rated		Not rated	
BpF:							
Breakneck, windswept	55	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.64			Depth to bedrock	0.65
				Slope	1.00	Large stones content	0.26
		Frost action	0.50	Cutbanks cave	0.10		
						Droughty	0.01
Pullback, windswept-	30	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to bedrock	1.00
						Droughty	0.96
		Slope	0.50	Slope	0.50	Slope	0.50
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.01
BwD:							
Burton, windswept---	50	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.54			Depth to bedrock	0.54
				Slope	1.00	Large stones content	0.16
		Frost action	0.50	Cutbanks cave	0.10		
Craggey, windswept--	40	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
						Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Droughty	0.99
		Frost action	0.50	Cutbanks cave	0.10		
BxE:							
Burton, windswept---	45	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.54			Depth to bedrock	0.54
				Slope	1.00	Large stones content	0.16
		Frost action	0.50	Cutbanks cave	0.10		
Craggey, windswept--	30	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
						Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Droughty	0.99
		Frost action	0.50	Cutbanks cave	0.10		
Rock outcrop--------	20	Not rated		Not rated		Not rated	
BxF:							
Burton, windswept---	45	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.54			Depth to berock	0.54
				Slope	1.00	Large stones content	0.16
		Frost action	0.50	Cutbanks cave	0.10		

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
BxF:							
Craggey, windswept	30	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
						Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Droughty	0.99
		Frost action	0.50	Cutbanks cave	0.10		
Rock outcrop	20	Not rated		Not rated		Not rated	
CaE:							
Cataska, very rocky	45	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Large stones content	1.00
		Large stones content	1.00	Slope	1.00	Droughty	1.00
		Depth to hard bedrock	0.64	Large stones content	1.00	Depth to berock	1.00
		Frost action	0.50				
Sylco, very rocky	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Large stones content	1.00	Slope	1.00	Large stones content	1.00
		Frost action	0.50	Large stones content	1.00	Depth to bedrock	0.46
		Depth to hard bedrock	0.46	Cutbanks cave	0.10	Droughty	0.01
CdF:							
Cataska, very stony	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Droughty	1.00
		Depth to hard bedrock	0.64	Slope	1.00	Depth to bedrock	1.00
		Large stones content	0.54	Large stones content	0.54	Large stones content	0.68
		Frost action	0.50				
Sylco, very stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Low strength	1.00	Slope	1.00	Large stones content	0.97
		Large stones content	0.99	Large stones content	0.99	Depth to bedrock	0.95
		Depth to hard bedrock	0.95	Cutbanks cave	0.10	Droughty	0.45
		Frost action	0.50				
Rock outcrop	20	Not rated		Not rated		Not rated	
ChD:							
Cheoah, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Jeffrey, stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50	Slope	1.00	Depth to bedrock	0.35
		Depth to hard bedrock	0.35	Cutbanks cave	0.10		

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
ChE:							
Cheoah, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Jeffrey, stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50			Depth to bedrock	0.35
		Depth to hard bedrock	0.35	Slope	1.00		
				Cutbanks cave	0.10		
ChF:							
Cheoah, stony	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Jeffrey, stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50			Depth to bedrock	0.35
		Depth to hard bedrock	0.35	Slope	1.00		
				Cutbanks cave	0.10		
CkB2:							
Clifton, moderately eroded	85	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
CkC2:							
Clifton, moderately eroded	85	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
CkD2:							
Clifton, moderately eroded	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
CkE2:							
Clifton, moderately eroded	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
CsB:							
Clifton, stony	85	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
CsC:							
Clifton, stony	85	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
CsD:							
Clifton, stony	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
CuB:							
Clifton	50	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Urban land	40	Not rated		Not rated		Not rated	
CuC:							
Clifton	50	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Urban land	40	Not rated		Not rated		Not rated	
CuD:							
Clifton	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Too clayey	0.12		
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Urban land	40	Not rated		Not rated		Not rated	
CxE:							
Craggey, windswept	50	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
						Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Droughty	0.99
		Frost action	0.50	Cutbanks cave	0.10		
Rock outcrop	20	Not rated		Not rated		Not rated	
Clingman, windswept	25	Very limited		Very limited		Not rated	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00		
		Slope	1.00	Slope	1.00		
		Frost action	1.00				
CxF:							
Craggey, windswept	50	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
						Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Droughty	0.99
		Frost action	0.50	Cutbanks cave	0.10		

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
CxF:							
Rock outcrop	20	Not rated		Not rated		Not rated	
Clingman, windswept	25	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Organic matter content	1.00
		Frost action	1.00			Depth to bedrock	1.00
						Too acid	1.00
DAM:							
Dam	100	Not rated		Not rated		Not rated	
DeA:							
Dellwood, occasionally flooded	60	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Cutbanks cave	1.00	Droughty	0.99
		Large stones content	0.02	Depth to saturated zone	0.95	Flooding	0.60
				Flooding	0.60	Gravel content	0.06
				Large stones content	0.02	Large stones content	0.03
Reddies, occasionally flooded	30	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	0.60
		Frost action	0.50	Depth to saturated zone	0.99	Droughty	0.01
				Flooding	0.60		
DrB:							
Dillard, rarely flooded	80	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Depth to saturated zone	0.99		
		Frost action	0.50	Cutbanks cave	0.10		
		Flooding	0.40				
EdC:							
Edneyville, stony	55	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Cutbanks cave	0.10		
Chestnut, stony	25	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Cutbanks cave	1.00	Slope	0.63
		Frost action	0.50	Slope	0.63	Large stones content	0.20
				Depth to soft bedrock	0.06	Droughty	0.08
						Depth to bedrock	0.06
EdD:							
Edneyville, stony	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
EdD:							
Chestnut, stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Large stones content	0.20
				Depth to soft bedrock	0.06	Droughty	0.08
						Depth to bedrock	0.06
EdE:							
Edneyville, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Chestnut, stony	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Large stones content	0.20
				Depth to soft bedrock	0.06	Droughty	0.08
						Depth to bedrock	0.06
EdF:							
Edneyville, stony	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Chestnut, stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Large stones content	0.20
				Depth to soft bedrock	0.06	Droughty	0.08
						Depth to bedrock	0.06
EvD2:							
Evard, moderately eroded	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Cowee, moderately eroded	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Depth to bedrock	0.74
				Depth to soft bedrock	0.74	Droughty	0.01
EvE2:							
Evard, moderately eroded	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Cowee, moderately eroded	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Depth to bedrock	0.74
				Depth to soft bedrock	0.74	Droughty	0.01

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
EvF2:							
Evard, moderately eroded-------------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Cowee, moderately eroded-------------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Depth to bedrock	0.74
				Depth to soft bedrock	0.74	Droughty	0.01
EwC:							
Evard, stony--------	55	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Cutbanks cave	0.10		
Cowee, stony--------	25	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Cutbanks cave	0.10	Depth to bedrock	0.01
				Depth to soft bedrock	0.01		
EwD:							
Evard, stony--------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Cowee, stony--------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Depth to bedrock	0.01
				Depth to soft bedrock	0.01		
EwE:							
Evard, stony--------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Cowee, stony--------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Depth to bedrock	0.01
				Depth to soft bedrock	0.01		
EwF:							
Evard, stony--------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Cowee, stony--------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Depth to bedrock	0.01
				Depth to soft bedrock	0.01		

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
ExC:							
Evard	40	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Cutbanks cave	0.10		
Cowee	25	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Cutbanks cave	1.00	Depth to bedrock	0.74
		Frost action	0.50	Depth to soft bedrock	0.74	Slope	0.63
						Droughty	0.01
				Slope	0.63		
Urban land	20	Not rated		Not rated		Not rated	
ExD:							
Evard	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Cowee	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Depth to bedrock	0.74
				Depth to soft bedrock	0.74	Droughty	0.01
Urban land	20	Not rated		Not rated		Not rated	
ExE:							
Evard	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Cowee	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Depth to bedrock	0.74
				Depth to soft bedrock	0.74	Droughty	0.01
Urban land	20	Not rated		Not rated		Not rated	
FaC2:							
Fannin, moderately eroded	55	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.01
Lauada, moderately eroded	25	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Depth to soft bedrock	0.15	Depth to bedrock	0.16
						Large stones content	0.01
				Cutbanks cave	0.10		
FaD2:							
Fannin, moderately eroded	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.01

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
FaD2:							
Lauada, moderately eroded	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to soft bedrock	0.15	Depth to bedrock	0.16
						Large stones content	0.01
				Cutbanks cave	0.10		
FaE2:							
Fannin, moderately eroded	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.01
Lauada, moderately eroded	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to soft bedrock	0.15	Depth to bedrock	0.16
						Large stones content	0.01
				Cutbanks cave	0.10		
FnB:							
Fannin, moderately eroded	40	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.01
Lauada, moderately eroded	25	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Depth to soft bedrock	0.15	Depth to bedrock	0.16
						Large stones content	0.01
				Cutbanks cave	0.10		
Urban land	20	Not rated		Not rated		Not rated	
FnC:							
Fannin, moderately eroded	40	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.01
Lauada, moderately eroded	25	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Depth to soft bedrock	0.15	Depth to bedrock	0.16
						Large stones content	0.01
				Cutbanks cave	0.10		
Urban land	20	Not rated		Not rated		Not rated	
FnD:							
Fannin, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.01

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
FnD:							
Lauada, moderately eroded	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to soft bedrock	0.15	Depth to bedrock	0.16
						Large stones content	0.01
				Cutbanks cave	0.10		
Urban land	20	Not rated		Not rated		Not rated	
FrA:							
French, occasionally flooded	90	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Depth to saturated zone	1.00	Flooding	0.60
		Frost action	0.50			Depth to saturated zone	0.48
		Depth to saturated zone	0.48	Cutbanks cave	1.00		
				Flooding	0.60	Large stones content	0.01
HcE:							
Heintooga, very stony	55	Very limited		Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00	Slope	1.00
						Large stones content	1.00
		Slope	1.00	Slope	1.00		
		Frost action	0.50	Cutbanks cave	0.10	Droughty	0.75
Chiltoskie, very stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.01
HpA:							
Hemphill, rarely flooded	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	0.10		
		Low strength	1.00				
		Flooding	0.40				
IoA:							
Iotla, occasionally flooded	85	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Depth to saturated zone	1.00	Flooding	0.60
		Frost action	0.50			Depth to saturated zone	0.43
		Depth to saturated zone	0.43	Cutbanks cave	1.00		
				Flooding	0.60		

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
JbB:							
Junaluska-----------	50	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.84
				Depth to soft bedrock	0.06	Depth to bedrock	0.06
Brasstown-----------	40	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.03
		Low strength	0.22				
JbC:							
Junaluska-----------	50	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Large stones content	0.84
		Frost action	0.50	Cutbanks cave	0.10	Slope	0.63
				Depth to soft bedrock	0.06	Depth to bedrock	0.06
Brasstown-----------	40	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.03
		Low strength	0.22				
JbD:							
Junaluska-----------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Depth to soft bedrock	0.79	Depth to bedrock	0.80
		Frost action	0.50	Cutbanks cave	0.10		
Brasstown-----------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Cutbanks cave	0.10	Large stones content	0.03
		Frost action	0.50				
JbE:							
Junaluska-----------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Depth to soft bedrock	0.79	Depth to bedrock	0.80
		Frost action	0.50	Cutbanks cave	0.10		
Brasstown-----------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Cutbanks cave	0.10	Large stones content	0.03
		Frost action	0.50				
KsB:							
Kanuga-------------	50	Very limited		Very limited		Not limited	
		Low strength	1.00	Cutbanks cave	1.00		
		Shrink-swell	0.50	Depth to saturated zone	0.99		
		Frost action	0.50	Too clayey	0.28		
Swannanoa-----------	35	Very limited		Very limited		Somewhat limited	
		Low strength	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.43
		Shrink-swell	0.50	Cutbanks cave	1.00		
		Frost action	0.50	Too clayey	0.28		
		Depth to saturated zone	0.43				

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
KsC:							
Kanuga	50	Very limited		Very limited		Somewhat limited	
		Low strength	1.00	Cutbanks cave	1.00	Slope	0.37
		Shrink-swell	0.50	Depth to saturated zone	0.99		
		Frost action	0.50	Slope	0.37		
		Slope	0.37	Too clayey	0.28		
Swannanoa	35	Very limited		Very limited		Somewhat limited	
		Low strength	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.43
		Shrink-swell	0.50	Cutbanks cave	1.00	Slope	0.37
		Frost action	0.50	Slope	0.37		
		Depth to saturated zone	0.43	Too clayey	0.28		
		Slope	0.37				
MvD:							
Mars Hill, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Walnut, stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Depth to bedrock	0.74
				Depth to soft bedrock	0.74	Droughty	0.07
MvE:							
Mars Hill, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Walnut, stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Depth to bedrock	0.74
				Depth to soft bedrock	0.74	Droughty	0.08
MvF:							
Mars Hill, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Walnut, stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Depth to bedrock	0.74
				Depth to soft bedrock	0.74	Droughty	0.07
MwD:							
Micaville, stony	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Gravel content	0.25
						Large stones content	0.01
Brownwood, stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to soft bedrock	0.71	Depth to bedrock	0.71
				Cutbanks cave	0.10	Droughty	0.19

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
MwE:							
Micaville, stony----	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Gravel content	0.25
						Large stones content	0.01
Brownwood, stony----	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to soft bedrock	0.71	Depth to bedrock	0.71
						Droughty	0.19
				Cutbanks cave	0.10		
MwF:							
Micaville, stony----	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Gravel content	0.25
						Large stones content	0.01
Brownwood, stony----	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to soft bedrock	0.71	Depth to bedrock	0.71
						Droughty	0.19
				Cutbanks cave	0.10		
NkA:							
Nikwasi, frequently flooded------------	70	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Flooding	1.00
						Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	1.00		
		Flooding	1.00	Flooding	0.80		
NtD:							
Northcove, very stony--------------	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
		Frost action	0.50	Cutbanks cave	0.10	Droughty	0.09
Maymead, very stony-	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
NtE:							
Northcove, very stony--------------	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00	Large stones content	1.00
		Frost action	0.50	Cutbanks cave	0.10	Droughty	0.09

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
NtE:							
Maymead, very stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
OwC:							
Oconaluftee, windswept	45	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Slope	0.37	Large stones content	0.46
		Slope	0.37	Cutbanks cave	0.10	Slope	0.37
						Gravel content	0.21
Guyot, windswept	25	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Slope	0.37	Slope	0.37
		Slope	0.37	Cutbanks cave	0.10	Large stones content	0.01
Cataloochee, windswept	20	Somewhat limited		Somewhat limited		Very limited	
		Frost action	0.50	Dense layer	0.50	Too acid	1.00
		Slope	0.37	Slope	0.37	Slope	0.37
				Depth to soft bedrock	0.35	Depth to bedrock	0.35
				Cutbanks cave	0.10	Large stones content	0.11
OwD:							
Oconaluftee, windswept	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.46
						Gravel content	0.21
Guyot, windswept	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.01
Cataloochee, windswept	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Dense layer	0.50	Too acid	1.00
				Depth to soft bedrock	0.35	Depth to bedrock	0.35
				Cutbanks cave	0.10	Large stones content	0.11
OwE:							
Oconaluftee, windswept	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.46
						Gravel content	0.21
Guyot, windswept	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.01

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
OwE:							
Cataloochee, windswept----------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Dense layer	0.50	Too acid	1.00
				Depth to soft bedrock	0.35	Depth to bedrock	0.35
				Cutbanks cave	0.10	Large stones content	0.11
OwF:							
Oconaluftee, windswept----------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.46
						Gravel content	0.21
Guyot, windswept----	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.01
Cataloochee, windswept----------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Dense layer	0.50	Too acid	1.00
				Depth to soft bedrock	0.35	Depth to bedrock	0.35
				Cutbanks cave	0.10	Large stones content	0.11
Pg:							
Pits, gravel--------	100	Not rated		Not rated		Not rated	
Pt:							
Pits, quarry--------	90	Not rated		Not rated		Not rated	
PwC:							
Porters, stony------	45	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Cutbanks cave	1.00	Slope	0.63
		Frost action	0.50	Slope	0.63		
				Depth to hard bedrock	0.13		
Unaka, stony--------	40	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Depth to hard bedrock	1.00	Depth to bedrock	0.71
		Frost action	0.50			Slope	0.63
		Depth to hard bedrock	0.35	Cutbanks cave	1.00		
				Depth to soft bedrock	0.71		
				Slope	0.63		
PwD:							
Porters, stony------	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00		
				Depth to hard bedrock	0.13		

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
PwD:							
Unaka, stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50	Slope	1.00	Depth to bedrock	0.71
		Depth to hard bedrock	0.35	Cutbanks cave	1.00		
				Depth to soft bedrock	0.71		
PwE:							
Porters, stony	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00		
				Depth to hard bedrock	0.13		
Unaka, stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50	Slope	1.00	Depth to bedrock	0.71
		Depth to hard bedrock	0.35	Cutbanks cave	1.00		
				Depth to soft bedrock	0.71		
PxF:							
Porters, rocky	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00		
				Depth to hard bedrock	0.13		
Unaka, rocky	35	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50	Slope	1.00	Depth to bedrock	0.71
		Depth to hard bedrock	0.35	Cutbanks cave	1.00		
				Depth to soft bedrock	0.71		
RdA:							
Reddies, occasionally flooded	80	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	0.60
		Frost action	0.50	Depth to saturated zone	0.99	Droughty	0.01
				Flooding	0.60		
RkF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Cleveland, very bouldery	30	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Droughty	1.00
		Frost action	0.50	Cutbanks cave	0.10	Depth to bedrock	1.00

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
RoF:							
Rock outcrop--------	60	Not rated		Not rated		Not rated	
Oteen, very bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Depth to soft bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Frost action	0.50	Cutbanks cave	0.10	Droughty	1.00
RsA:							
Rosman, occasionally flooded------------	80	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Frost action	0.50	Depth to saturated zone	0.47		
				Cutbanks cave	0.10		
SoD:							
Soco, stony---------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Depth to bedrock	0.10
				Depth to soft bedrock	0.10		
Stecoah, stony------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
SoE:							
Soco, stony---------	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Depth to bedrock	0.10
				Depth to soft bedrock	0.10		
Stecoah, stony------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
SoF:							
Soco, stony---------	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Depth to bedrock	0.10
				Depth to soft bedrock	0.10		
Stecoah, stony------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
StB:							
Statler, rarely flooded------------	85	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Depth to saturated zone	0.16		
		Frost action	0.50	Cutbanks cave	0.10		
		Flooding	0.40				

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
SyD:							
Sylco, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.95	Slope	1.00	Depth to bedrock	0.95
		Frost action	0.50	Cutbanks cave	0.10	Droughty	0.41
						Large stones content	0.20
Soco, stony	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.92
				Depth to soft bedrock	0.10	Depth to bedrock	0.10
SyE:							
Sylco, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.95	Slope	1.00	Depth to bedrock	0.95
		Frost action	0.50	Cutbanks cave	0.10	Droughty	0.41
						Large stones content	0.20
Soco, stony	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.92
				Depth to soft bedrock	0.10	Depth to bedrock	0.10
SzF:							
Sylco, very stony	50	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.95	Slope	1.00	Depth to bedrock	0.95
		Frost action	0.50	Cutbanks cave	0.10	Droughty	0.41
						Large stones content	0.20
Soco, very stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.92
				Depth to soft bedrock	0.10	Depth to bedrock	0.10
TaB:							
Tate	85	Very limited		Somewhat limited		Not limited	
		Low strength	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
TaC:							
Tate	85	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Cutbanks cave	0.10		
		Frost action	0.50				
TaD:							
Tate	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Cutbanks cave	0.10		
		Frost action	0.50				

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
TkC:							
Tate, very stony----	85	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Cutbanks cave	1.00	Slope	0.63
		Frost action	0.50	Slope	0.63		
TkD:							
Tate, very stony----	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00		
TmB:							
Tate----------------	50	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
		Low strength	0.22				
Urban land----------	40	Not rated		Not rated		Not rated	
TmC:							
Tate----------------	50	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Cutbanks cave	0.10		
		Low strength	0.22				
Urban land----------	40	Not rated		Not rated		Not rated	
TmD:							
Tate----------------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
		Low strength	0.22				
Urban land----------	40	Not rated		Not rated		Not rated	
TnE:							
Toecane, extremely bouldery-----------	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Cutbanks cave	1.00	Large stones content	1.00
				Large stones content	1.00		
		Frost action	0.50			Droughty	0.07
ToC:							
Toecane, bouldery---	50	Somewhat limited		Very limited		Somewhat limited	
		Large stones content	0.83	Cutbanks cave	1.00	Large stones content	0.88
				Large stones content	0.83		
		Slope	0.63			Slope	0.63
		Frost action	0.50	Slope	0.63	Droughty	0.07
Tusquitee, bouldery-	40	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.01
TpD:							
Toecane, very bouldery-----------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	0.83	Cutbanks cave	1.00	Large stones content	0.88
				Large stones content	0.83		
		Frost action	0.50			Droughty	0.07

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
TpD:							
Tusquitee, very bouldery-----------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Large stones content	0.20
						Gravel content	0.07
TpE:							
Toecane, very bouldery-----------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	0.83	Cutbanks cave	1.00	Large stones content	0.88
		Frost action	0.50	Large stones content	0.83	Droughty	0.07
Tusquitee, very bouldery-----------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Large stones content	0.20
						Gravel content	0.07
TsA:							
Toxaway, frequently flooded------------	80	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Flooding	1.00
		Frost action	1.00	Cutbanks cave	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Flooding	0.80		
		Low strength	0.22				
TtE:							
Trimont, stony------	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.11
						Gravel content	0.05
TuD:							
Tusquitee, stony----	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Large stones content	0.20
						Gravel content	0.07
Toecane, stony------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones content	1.00	Cutbanks cave	1.00	Large stones content	1.00
		Frost action	0.50	Large stones content	1.00	Droughty	0.07

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
TwB:							
Tusquitee	55	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
Whiteside	35	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Depth to saturated zone	0.99		
				Cutbanks cave	0.10		
TwC:							
Tusquitee	55	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Cutbanks cave	1.00	Slope	0.63
		Frost action	0.50	Slope	0.63		
Whiteside	35	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Depth to saturated zone	0.99	Slope	0.63
		Frost action	0.50				
				Slope	0.63		
				Cutbanks cave	0.10		
UcB:							
Udifluvents, frequently flooded	95	Very limited		Very limited		Very limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	1.00
				Flooding	0.80	Too sandy	0.50
				Depth to saturated zone	0.47	Droughty	0.34
Ud:							
Udorthents, loamy	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Frost action	0.50	Cutbanks cave	0.10	Slope	0.01
		Slope	0.01	Slope	0.01		
UfB:							
Udorthents, occasionally flooded	60	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Frost action	0.50	Cutbanks cave	0.10		
Urban land, occasionally flooded	30	Not rated		Not rated		Not rated	
UhE:							
Udorthents, rocky	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
		Low strength	0.22				
Urban land	40	Not rated		Not rated		Not rated	
UkD:							
Unaka, very bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard berock	1.00	Slope	1.00
		Frost action	0.50			Depth to bedrock	0.71
		Depth to hard bedrock	0.35	Slope	1.00		
				Cutbanks cave	1.00		
				Depth to soft bedrock	0.71		

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
UkD:							
Rock outcrop	35	Not rated		Not rated		Not rated	
UkE:							
Unaka, very bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50	Slope	1.00	Depth to bedrock	0.71
		Depth to hard bedrock	0.35	Cutbanks cave	1.00		
				Depth to soft bedrock	0.71		
Rock outcrop	35	Not rated		Not rated		Not rated	
UkF:							
Unaka, very bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50	Slope	1.00	Depth to bedrock	0.71
		Depth to hard bedrock	0.35	Cutbanks cave	1.00		
				Depth to soft bedrock	0.71		
Rock outcrop	35	Not rated		Not rated		Not rated	
UnB:							
Unison	90	Very limited		Very limited		Somewhat limited	
		Low strength	1.00	Cutbanks cave	1.00	Large stones content	0.01
		Shrink-swell	0.50	Too clayey	0.50		
		Frost action	0.50				
UnC:							
Unison	80	Very limited		Very limited		Somewhat limited	
		Low strength	1.00	Cutbanks cave	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Large stones content	0.01
		Shrink-swell	0.50	Too clayey	0.50		
		Frost action	0.50				
UnD:							
Unison	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Cutbanks cave	1.00	Large stones content	0.01
		Shrink-swell	0.50	Too clayey	0.50		
		Frost action	0.50				
UrB:							
Unison	60	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Too clayey	0.50	Large stones content	0.01
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Urban land	30	Not rated		Not rated		Not rated	
UrC:							
Unison	60	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Too clayey	0.50	Large stones content	0.01
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
UrC:							
Urban land	30	Not rated		Not rated		Not rated	
Ux:							
Urban land	90	Not rated		Not rated		Not rated	
W:							
Water	100	Not rated		Not rated		Not rated	
WaC2:							
Walnut, moderately eroded	40	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Cutbanks cave	1.00	Depth to bedrock	0.74
		Frost action	0.50	Depth to soft bedrock	0.74	Slope	0.63
				Slope	0.63	Droughty	0.21
Oteen, moderately eroded	35	Somewhat limited		Very limited		Very limited	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Droughty	1.00
		Frost action	0.50	Cutbanks cave	0.10	Slope	0.63
Mars Hill, moderately eroded	20	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Cutbanks cave	0.10		
WaD2:							
Walnut, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Depth to bedrock	0.74
				Depth to soft bedrock	0.74	Droughty	0.21
Oteen, moderately eroded	35	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Depth to soft bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Frost action	0.50	Cutbanks cave	0.10	Droughty	1.00
Mars Hill, moderately eroded	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
WaE2:							
Walnut, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Depth to bedrock	0.74
				Depth to soft bedrock	0.74	Droughty	0.21

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
WaE2:							
Oteen, moderately eroded	35	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Depth to soft bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Frost action	0.50	Cutbanks cave	0.10	Droughty	1.00
Mars Hill, moderately eroded	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
WnF:							
Walnut	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Depth to bedrock	0.74
				Depth to soft bedrock	0.74	Droughty	0.08
Oteen	35	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Depth to soft bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Frost action	0.50	Cutbanks cave	0.10	Droughty	1.00
Rock outcrop	20	Not rated		Not rated		Not rated	
WoE:							
Wayah, bouldery	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Large stones content	0.01
Burton, bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.84	Slope	1.00	Large stones content	1.00
		Frost action	0.50	Cutbanks cave	0.10	Depth to bedrock	0.84
						Droughty	0.51
WpF:							
Wayah, very rocky	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Large stones content	0.01
Burton, very rocky	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.84	Slope	1.00	Large stones content	1.00
		Frost action	0.50	Cutbanks cave	0.10	Depth to bedrock	0.84
						Droughty	0.51
WrC:							
Wayah, windswept	50	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Cutbanks cave	1.00	Slope	0.63
		Frost action	0.50	Slope	0.63	Large stones content	0.01

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
WrC:							
Burton, windswept---	40	Somewhat limited		Very limited		Somewhat limited	
		Depth to hard bedrock	0.71	Depth to hard bedrock	1.00	Depth to bedrock	0.90
		Slope	0.63	Depth to soft bedrock	0.90	Slope	0.63
		Frost action	0.50	Slope	0.63	Large stones content	0.26
				Cutbanks cave	0.10		
WrD:							
Wayah, windswept----	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Large stones content	0.01
Burton, windswept---	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.71	Slope	1.00	Depth to bedrock	0.90
		Frost action	0.50	Depth to soft bedrock	0.90	Large stones content	0.26
				Cutbanks cave	0.10		
WrE:							
Wayah, windswept----	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Large stones content	0.01
Burton, windswept---	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.71	Slope	1.00	Depth to bedrock	0.90
		Frost action	0.50	Depth to soft bedrock	0.90	Large stones content	0.26
				Cutbanks cave	0.10		
WsF:							
Wayah, windswept----	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Large stones content	0.01
Burton, windswept---	30	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.84	Slope	1.00	Depth to bedrock	0.84
		Frost action	0.50	Cutbanks cave	0.10	Large stones content	0.26
WtB:							
Whiteside-----------	90	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Depth to saturated zone	0.99		
				Cutbanks cave	0.10		
WtC:							
Whiteside-----------	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Depth to saturated zone	0.99	Slope	0.63
		Frost action	0.50	Slope	0.63		
				Cutbanks cave	0.10		

Table 11.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
ZcB:							
Zillicoa	85	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Too clayey	0.28	Large stones content	0.01
		Frost action	0.50	Cutbanks cave	0.10		
ZcC:							
Zillicoa	85	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Too clayey	0.28	Large stones content	0.01
		Frost action	0.50	Cutbanks cave	0.10		
ZoD:							
Zillicoa, stony	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Low strength	1.00	Too clayey	0.28	Large stones content	0.01
		Frost action	0.50	Cutbanks cave	0.10		

Table 12.—Sanitary Facilities, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
AcD:					
Ashe, very stony	40	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Cleveland, very stony	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Rock outcrop	20	Not rated		Not rated	
ArE:					
Ashe, very bouldery	40	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Cleveland, very bouldery	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Rock outcrop	20	Not rated		Not rated	
ArF:					
Ashe, very bouldery	40	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Cleveland, very bouldery	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Rock outcrop	20	Not rated		Not rated	

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
BaD:					
Balsam, extremely bouldery	60	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Large stones content	1.00
Tanasee, extremely bouldery	30	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
BaE:					
Balsam, extremely bouldery	60	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Large stones content	1.00
Tanasee, extremely bouldery	30	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
BeA:					
Biltmore, occasionally flooded	90	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Filtering capacity	1.00	Depth to saturated zone	0.02
		Depth to saturated zone	0.65		
BkB2:					
Braddock, moderately eroded	80	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50	Slope	0.68
BkC2:					
Braddock, moderately eroded	80	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
		Slow water movement	0.50		

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
BkD2:					
Braddock, moderately eroded	85	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		
BnB:					
Braddock	40	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.92
		Slow water movement	0.50		
Urban land	30	Not rated		Not rated	
BnC:					
Braddock	40	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
		Slope	0.63		
		Slow water movement	0.50		
Urban land	30	Not rated		Not rated	
BpF:					
Breakneck, windswept	55	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00
Pullback, windswept	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.50	Seepage	1.00
BwD:					
Burton, windswept	50	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00		
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
Craggey, windswept	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00		
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
BxE:					
Burton, windswept	45	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00		
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
BxE:					
Craggey, windswept--	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Rock outcrop--------	20	Not rated		Not rated	
BxF:					
Burton, windswept---	45	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Craggey, windswept--	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Rock outcrop--------	20	Not rated		Not rated	
CaE:					
Cataska, very rocky-	45	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Depth to soft bedrock	1.00
		Large stones content	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Large stones content	1.00
Sylco, very rocky---	40	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Large stones content	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Large stones content	1.00
CdF:					
Cataska, very stony-	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
		Large stones content	0.54	Seepage	0.18
				Large stones content	0.07
Sylco, very stony---	30	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Large stones content	0.99	Large stones content	1.00

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
CdF:					
Rock outcrop	20	Not rated		Not rated	
ChD:					
Cheoah, stony	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.73	Depth to soft bedrock	0.32
Jeffrey, stony	30	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
ChE:					
Cheoah, stony	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.73	Depth to soft bedrock	0.32
Jeffrey, stony	30	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
ChF:					
Cheoah, stony	60	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.73	Depth to soft bedrock	0.32
Jeffrey, stony	30	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
CkB2:					
Clifton, moderately eroded	85	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50	Slope	0.68
CkC2:					
Clifton, moderately eroded	85	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
		Slow water movement	0.50		

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
CkD2:					
Clifton, moderately eroded------------	80	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		
CkE2:					
Clifton, moderately eroded------------	85	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		
CsB:					
Clifton, stony------	85	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.68
		Slow water movement	0.50		
CsC:					
Clifton, stony------	85	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
		Slope	0.63		
		Slow water movement	0.50		
CsD:					
Clifton, stony------	85	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		
CuB:					
Clifton-------------	50	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.68
		Slow water movement	0.50		
Urban land----------	40	Not rated		Not rated	
CuC:					
Clifton-------------	50	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
		Slope	0.63		
		Slow water movement	0.50		
Urban land----------	40	Not rated		Not rated	

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
CuD:					
Clifton	50	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		
Urban land	40	Not rated		Not rated	
CxE:					
Craggey, windswept	50	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Rock outcrop	20	Not rated		Not rated	
Clingman, windswept	25	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Organic matter content	1.00
CxF:					
Craggey, windswept	50	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Rock outcrop	20	Not rated		Not rated	
Clingman, windswept	25	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Organic matter content	1.00
DAM:					
Dam	100	Not rated		Not rated	
DeA:					
Dellwood, occasionally flooded	60	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Filtering capacity	1.00		
		Large stones content	0.02		

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
DeA:					
Reddies, occasionally flooded-----------	30	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
DrB:					
Dillard, rarely flooded-----------	80	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50	Flooding	0.40
		Flooding	0.40	Slope	0.08
EdC:					
Edneyville, stony---	55	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
Chestnut, stony-----	25	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
EdD:					
Edneyville, stony---	50	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Chestnut, stony-----	35	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
EdE:					
Edneyville, stony---	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Chestnut, stony-----	25	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
EdF:					
Edneyville, stony---	45	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Chestnut, stony-----	35	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
EvD2:					
Evard, moderately eroded-------------	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Cowee, moderately eroded-------------	35	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
EvE2:					
Evard, moderately eroded-------------	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Cowee, moderately eroded-------------	35	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
EvF2:					
Evard, moderately eroded-------------	50	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Cowee, moderately eroded-------------	30	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
EwC:					
Evard, stony--------	55	Somewhat limited		Very limited	
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
EwC:					
Cowee, stony	25	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
EwD:					
Evard, stony	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Cowee, stony	25	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
EwE:					
Evard, stony	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Cowee, stony	25	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
EwF:					
Evard, stony	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Cowee, stony	25	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
ExC:					
Evard	40	Somewhat limited		Very limited	
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Cowee	25	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Urban land	20	Not rated		Not rated	

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
ExD:					
Evard	40	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Cowee	25	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Urban land	20	Not rated		Not rated	
ExE:					
Evard	40	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Cowee	30	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Urban land	20	Not rated		Not rated	
FaC2:					
Fannin, moderately eroded	55	Somewhat limited		Very limited	
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Lauada, moderately eroded	25	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
FaD2:					
Fannin, moderately eroded	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Lauada, moderately eroded	25	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
FaE2:					
Fannin, moderately eroded	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Lauada, moderately eroded	25	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00		
		Slow water movement	0.50	Slope	1.00
				Seepage	0.50
FnB:					
Fannin, moderately eroded	40	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Slope	0.68
				Seepage	0.50
Lauada, moderately eroded	25	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slow water movement	0.50		
				Slope	0.68
				Seepage	0.50
Urban land	20	Not rated		Not rated	
FnC:					
Fannin, moderately eroded	40	Somewhat limited		Very limited	
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Lauada, moderately eroded	25	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.63		
		Slow water movement	0.50	Slope	1.00
				Seepage	0.50
Urban land	20	Not rated		Not rated	
FnD:					
Fannin, moderately eroded	40	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Lauada, moderately eroded	25	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00		
		Slow water movement	0.50	Slope	1.00
				Seepage	0.50
Urban land	20	Not rated		Not rated	

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
FrA:					
French, occasionally flooded	90	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.50		
HcE:					
Heintooga, very stony	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Chiltoskie, very stony	35	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
HpA:					
Hemphill, rarely flooded	75	Very limited		Very limited	
		Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Flooding	0.40
		Flooding	0.40		
IoA:					
Iotla, occasionally flooded	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
JbB:					
Junaluska	50	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.68

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
JbB:					
Brasstown-----------	40	Somewhat limited		Somewhat limited	
		Depth to bedrock	0.94	Depth to soft bedrock	0.84
		Slow water movement	0.50	Slope	0.68
				Seepage	0.50
JbC:					
Junaluska-----------	50	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
Brasstown-----------	40	Somewhat limited		Very limited	
		Depth to bedrock	0.94	Slope	1.00
		Slope	0.63	Depth to soft bedrock	0.84
		Slow water movement	0.50	Seepage	0.50
JbD:					
Junaluska-----------	50	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Brasstown-----------	40	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Depth to bedrock	0.94	Depth to soft bedrock	0.84
		Slow water movement	0.50	Seepage	0.50
JbE:					
Junaluska-----------	50	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Brasstown-----------	40	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Depth to bedrock	0.94	Depth to soft bedrock	0.84
		Slow water movement	0.50	Seepage	0.50
KsB:					
Kanuga--------------	50	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slope	0.68
Swannanoa-----------	35	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slope	0.68
				Seepage	0.50

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
KsC:					
Kanuga--------------	50	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Slope	0.37		
Swannanoa-----------	35	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
		Slow water movement	1.00	Depth to saturated zone	1.00
		Slope	0.37	Seepage	0.50
MvD:					
Mars Hill, stony----	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.91	Depth to soft bedrock	0.77
Walnut, stony-------	35	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
MvE:					
Mars Hill, stony----	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.91	Depth to soft bedrock	0.77
Walnut, stony-------	35	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
MvF:					
Mars Hill, stony----	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.91	Depth to soft bedrock	0.77
Walnut, stony-------	35	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
MwD:					
Micaville, stony----	45	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.73	Depth to soft bedrock	0.32

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
MwD:					
Brownwood, stony----	35	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
MwE:					
Micaville, stony----	50	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.73	Depth to soft bedrock	0.32
Brownwood, stony----	30	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
MwF:					
Micaville, stony----	40	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.73	Depth to soft bedrock	0.32
Brownwood, stony----	35	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
NkA:					
Nikwasi, frequently flooded------------	70	Very limited		Very limited	
		Flooding	1.00	Ponding	1.00
		Ponding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
NtD:					
Northcove, very stony--------------	60	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Large stones content	1.00

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
NtD:					
Maymead, very stony-	30	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
NtE:					
Northcove, very stony-	45	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Large stones content	1.00
Maymead, very stony-	35	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
OwC:					
Oconaluftee, windswept-	45	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.37	Seepage	1.00
Guyot, windswept-	25	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Depth to bedrock	0.59	Seepage	1.00
		Slope	0.37	Depth to soft bedrock	0.13
Cataloochee, windswept-	20	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.37	Seepage	1.00
OwD:					
Oconaluftee, windswept-	45	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Guyot, windswept-	25	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.59	Depth to soft bedrock	0.13
Cataloochee, windswept-	20	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
OwE:					
Oconaluftee, windswept	35	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Guyot, windswept	30	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.59	Depth to soft bedrock	0.13
Cataloochee, windswept	25	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
OwF:					
Oconaluftee, windswept	40	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Guyot, windswept	35	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.59	Depth to soft bedrock	0.13
Cataloochee, windswept	25	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Pg:					
Pits, gravel	100	Not rated		Not rated	
Pt:					
Pits, quarry	90	Not rated		Not rated	
PwC:					
Porters, stony	45	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
		Slope	0.63	Depth to hard bedrock	0.13
		Depth to bedrock	0.59		
Unaka, stony	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00		
				Depth to soft bedrock	1.00
		Slope	0.63		
				Slope	1.00
				Seepage	1.00

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
PwD:					
Porters, stony	60	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.59	Depth to hard bedrock	0.13
Unaka, stony	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
PwE:					
Porters, stony	50	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.59	Depth to hard bedrock	0.13
Unaka, stony	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
PxF:					
Porters, rocky	40	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.59	Depth to hard bedrock	0.13
Unaka, rocky	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
RdA:					
Reddies, occasionally flooded	80	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
RkF:					
Rock outcrop--------	60	Not rated		Not rated	
Cleveland, very bouldery-----------	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
RoF:					
Rock outcrop--------	60	Not rated		Not rated	
Oteen, very bouldery	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
RsA:					
Rosman, occasionally flooded------------	80	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to saturated zone	0.94	Depth to saturated zone	0.40
SoD:					
Soco, stony---------	50	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Stecoah, stony------	40	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.94	Depth to soft bedrock	0.84
SoE:					
Soco, stony---------	65	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Stecoah, stony------	25	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.78	Depth to soft bedrock	0.42
SoF:					
Soco, stony---------	45	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
SoF:					
Stecoah, stony	35	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.94	Depth to soft bedrock	0.84
StB:					
Statler, rarely flooded	85	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
		Depth to saturated zone	0.43	Flooding	0.40
		Flooding	0.40	Slope	0.08
SyD:					
Sylco, stony	55	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Soco, stony	40	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
SyE:					
Sylco, stony	55	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Soco, stony	40	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
SzF:					
Sylco, very stony	50	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Soco, very stony	35	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
TaB:					
Tate	85	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50	Slope	0.68

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
TaC:					
Tate	85	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
		Slow water movement	0.50		
TaD:					
Tate	85	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		
TkC:					
Tate, very stony	85	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
		Slow water movement	0.50		
TkD:					
Tate, very stony	85	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		
TmB:					
Tate	50	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50	Slope	0.68
Urban land	40	Not rated		Not rated	
TmC:					
Tate	50	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
		Slow water movement	0.50		
Urban land	40	Not rated		Not rated	
TmD:					
Tate	50	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		
Urban land	40	Not rated		Not rated	

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
TnE:					
Toecane, extremely bouldery-----------	85	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
ToC:					
Toecane, bouldery---	50	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
		Large stones content	0.83	Large stones content	0.99
		Slope	0.63		
Tusquitee, bouldery-	40	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
		Slope	0.63		
TpD:					
Toecane, very bouldery-----------	50	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Large stones content	0.99
		Large stones content	0.83		
Tusquitee, very bouldery-----------	40	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
TpE:					
Toecane, very bouldery-----------	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Large stones content	0.99
		Large stones content	0.83		
Tusquitee, very bouldery-----------	35	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
TsA:					
Toxaway, frequently flooded	80	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		
TtE:					
Trimont, stony	85	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
TuD:					
Tusquitee, stony	65	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Toecane, stony	25	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Large stones content	1.00
TwB:					
Tusquitee	55	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.68
Whiteside	35	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50	Slope	0.68
TwC:					
Tusquitee	55	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
Whiteside	35	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slope	0.63	Seepage	1.00
		Slow water movement	0.50		

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
UcB:					
Udifluvents, frequently flooded	95	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Filtering capacity	1.00	Depth to saturated zone	0.40
		Depth to saturated zone	0.94	Slope	0.08
Ud:					
Udorthents, loamy	85	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
		Slope	0.01		
UfB:					
Udorthents, occasionally flooded	60	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.08
Urban land, occasionally flooded	30	Not rated		Not rated	
UhE:					
Udorthents, rocky	55	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Urban land	40	Not rated		Not rated	
UkD:					
Unaka, very bouldery	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
Rock outcrop	35	Not rated		Not rated	
UkE:					
Unaka, very bouldery	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
Rock outcrop	35	Not rated		Not rated	

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
UkF:					
Unaka, very bouldery	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00		
		Seepage, bottom layer	1.00	Depth to soft bedrock	1.00
				Slope	1.00
				Seepage	1.00
Rock outcrop--------	35	Not rated		Not rated	
UnB:					
Unison--------------	90	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.68
		Slow water movement	0.50		
UnC:					
Unison--------------	80	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
		Slope	0.63		
		Slow water movement	0.50		
UnD:					
Unison--------------	80	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		
UrB:					
Unison--------------	60	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Slope	0.68
				Seepage	0.50
Urban land----------	30	Not rated		Not rated	
UrC:					
Unison--------------	60	Somewhat limited		Very limited	
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Urban land----------	30	Not rated		Not rated	
Ux:					
Urban land----------	90	Not rated		Not rated	
W:					
Water---------------	100	Not rated		Not rated	

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
WaC2:					
Walnut, moderately eroded	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
Oteen, moderately eroded	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
Mars Hill, moderately eroded	20	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
		Depth to bedrock	0.91	Depth to soft bedrock	0.77
		Slope	0.63		
WaD2:					
Walnut, moderately eroded	40	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Oteen, moderately eroded	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Mars Hill, moderately eroded	20	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.91	Depth to soft bedrock	0.77
WaE2:					
Walnut, moderately eroded	40	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
WaE2:					
Oteen, moderately eroded	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Mars Hill, moderately eroded	20	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.91	Depth to soft bedrock	0.77
WnF:					
Walnut	45	Very limited		Very limited	
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Oteen	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Rock outcrop	20	Not rated		Not rated	
WoE:					
Wayah, bouldery	50	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Burton, bouldery	40	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Large stones content	0.34
WpF:					
Wayah, very rocky	50	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Burton, very rocky	40	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Large stones content	0.34

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
WrC:					
Wayah, windswept----	50	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
Burton, windswept---	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Depth to soft bedrock	1.00
		Slope	0.63	Slope	1.00
				Seepage	1.00
WrD:					
Wayah, windswept----	50	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Burton, windswept---	40	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
WrE:					
Wayah, windswept----	50	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Burton, windswept---	40	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
				Seepage	1.00
WsF:					
Wayah, windswept----	60	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
Burton, windswept---	30	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00

Table 12.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
WtB:					
Whiteside-----------	90	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.68
		Slow water movement	0.50		
WtC:					
Whiteside-----------	90	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
				Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slope	0.63		
		Slow water movement	0.50		
ZcB:					
Zillicoa------------	85	Very limited		Somewhat limited	
		Slow water movement	1.00	Slope	0.68
				Depth to soft bedrock	0.61
		Depth to bedrock	0.86		
				Seepage	0.50
ZcC:					
Zillicoa------------	85	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
				Depth to soft bedrock	0.61
		Depth to bedrock	0.86		
		Slope	0.63	Seepage	0.50
ZoD:					
Zillicoa, stony-----	85	Very limited		Very limited	
		Slow water movement	1.00	Slope	1.00
				Depth to soft bedrock	0.61
		Slope	1.00		
		Depth to bedrock	0.86	Seepage	0.50

Table 12.—Sanitary Facilities, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AcD:							
Ashe, very stony----	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Cleveland, very stony--------------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Rock outcrop--------	20	Not rated		Not rated		Not rated	
ArE:							
Ashe, very bouldery-	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Cleveland, very bouldery-----------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Rock outcrop--------	20	Not rated		Not rated		Not rated	
ArF:							
Ashe, very bouldery-	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Cleveland, very bouldery-----------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Rock outcrop--------	20	Not rated		Not rated		Not rated	
BaD:							
Balsam, extremely bouldery-----------	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
BaD:							
Tanasee, extremely bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
						Gravel content	0.01
BaE:							
Balsam, extremely bouldery	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Tanasee, extremely bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
						Gravel content	0.01
BeA:							
Biltmore, occasionally flooded	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00		
		Too sandy	1.00				
BkB2:							
Braddock, moderately eroded	80	Very limited		Not limited		Very limited	
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
BkC2:							
Braddock, moderately eroded	80	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
		Slope	0.63			Slope	0.63
BkD2:							
Braddock, moderately eroded	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
BnB:							
Braddock	40	Very limited		Not limited		Very limited	
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BnB:							
Urban land	30	Not rated		Not rated		Not rated	
BnC:							
Braddock	40	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
		Slope	0.63			Slope	0.63
Urban land	30	Not rated		Not rated		Not rated	
BpF:							
Breakneck, windswept	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Depth to bedrock	1.00	Seepage	0.52
Pullback, windswept	30	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Slope	0.50	Seepage	0.52
		Slope	0.50			Slope	0.50
BwD:							
Burton, windswept	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Craggey, windswept	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
BxE:							
Burton, windswept	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Craggey, windswept	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Rock outcrop	20	Not rated		Not rated		Not rated	
BxF:							
Burton, windswept	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
BxF:							
Craggey, windswept	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Rock outcrop	20	Not rated		Not rated		Not rated	
CaE:							
Cataska, very rocky	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Large stones	1.00			Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	1.00
Sylco, very rocky	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.21
CdF:							
Cataska, very stony	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	1.00
		Large stones content	0.54			Large stones content	0.54
Sylco, very stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Large stones content	0.99
		Large stones content	0.99			Seepage	0.21
Rock outcrop	20	Not rated		Not rated		Not rated	
ChD:							
Cheoah, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.32	Depth to bedrock	0.32
Jeffrey, stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ChE:							
Cheoah, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.32	Depth to bedrock	0.32
Jeffrey, stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
ChF:							
Cheoah, stony	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.32	Depth to bedrock	0.32
Jeffrey, stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
CkB2:							
Clifton, moderately eroded	85	Very limited		Not limited		Very limited	
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
CkC2:							
Clifton, moderately eroded	85	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
		Slope	0.63			Slope	0.63
CkD2:							
Clifton, moderately eroded	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
CkE2:							
Clifton, moderately eroded	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CsB:							
Clifton, stony	85	Very limited		Not limited		Very limited	
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
CsC:							
Clifton, stony	85	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
		Slope	0.63			Slope	0.63
CsD:							
Clifton, stony	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
CuB:							
Clifton	50	Very limited		Not limited		Very limited	
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
Urban land	40	Not rated		Not rated		Not rated	
CuC:							
Clifton	50	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
		Slope	0.63			Slope	0.63
Urban land	40	Not rated		Not rated		Not rated	
CuD:							
Clifton	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
Urban land	40	Not rated		Not rated		Not rated	
CxE:							
Craggey, windswept	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Rock outcrop	20	Not rated		Not rated		Not rated	
Clingman, windswept	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Organic matter content	1.00			Organic matter content	1.00
		Seepage, bottom layer	1.00			Too acid	1.00
						Seepage	0.50

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CxF:							
Craggey, windswept--	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Rock outcrop--------	20	Not rated		Not rated		Not rated	
Clingman, windswept-	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Organic matter content	1.00			Organic matter content	1.00
		Seepage, bottom layer	1.00			Too acid	1.00
						Seepage	0.50
DAM:							
Dam-----------------	100	Not rated		Not rated		Not rated	
DeA:							
Dellwood, occasionally flooded-----------	60	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
						Gravel content	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Large stones content	0.14
		Too sandy	1.00			Depth to saturated zone	0.09
		Large stones content	0.14				
Reddies, occasionally flooded-----------	30	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
						Depth to saturated zone	0.24
		Seepage, bottom layer	1.00	Seepage	1.00	Gravel content	0.13
		Too sandy	1.00				
DrB:							
Dillard, rarely flooded-----------	80	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
						Depth to saturated zone	0.47
		Seepage, bottom layer	1.00	Flooding	0.40		
		Too clayey	0.50				
		Flooding	0.40				

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
EdC:							
Edneyville, stony---	55	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50
Chestnut, stony-----	25	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50
						Gravel content	0.01
EdD:							
Edneyville, stony---	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Chestnut, stony-----	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
						Gravel content	0.01
EdE:							
Edneyville, stony---	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Chestnut, stony-----	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
						Gravel content	0.01
EdF:							
Edneyville, stony---	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Chestnut, stony-----	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
						Gravel content	0.01
EvD2:							
Evard, moderately eroded-------------	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee, moderately eroded-------------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Gravel content	0.11

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
EvE2:							
Evard, moderately eroded	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee, moderately eroded	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Gravel content	0.11
EvF2:							
Evard, moderately eroded	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee, moderately eroded	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Gravel content	0.11
EwC:							
Evard, stony	55	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
						Too clayey	0.50
Cowee, stony	25	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
EwD:							
Evard, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Too clayey	0.50
Cowee, stony	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	0.50			Too clayey	0.50
EwE:							
Evard, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Too clayey	0.50
Cowee, stony	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	0.50			Too clayey	0.50
EwF:							
Evard, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Too clayey	0.50

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
EwF:							
Cowee, stony	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too clayey	0.50			Too clayey	0.50
						Gravel content	0.01
ExC:							
Evard	40	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
Cowee	25	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
						Gravel content	0.11
Urban land	20	Not rated		Not rated		Not rated	
ExD:							
Evard	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Gravel content	0.11
Urban land	20	Not rated		Not rated		Not rated	
ExE:							
Evard	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Cowee	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Gravel content	0.11
Urban land	20	Not rated		Not rated		Not rated	
FaC2:							
Fannin, moderately eroded	55	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
Lauada, moderately eroded	25	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
FaD2:							
Fannin, moderately eroded	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Lauada, moderately eroded	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
FaE2:							
Fannin, moderately eroded	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Lauada, moderately eroded	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
FnB:							
Fannin, moderately eroded	40	Not limited		Not limited		Not limited	
Lauada, moderately eroded	25	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
Urban land	20	Not rated		Not rated		Not rated	
FnC:							
Fannin, moderately eroded	40	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
Lauada, moderately eroded	25	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
Urban land	20	Not rated		Not rated		Not rated	
FnD:							
Fannin, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Lauada, moderately eroded	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
Urban land	20	Not rated		Not rated		Not rated	
FrA:							
French, occasionally flooded	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Depth to saturated zone	0.96
		Too sandy	1.00			Gravel content	0.16
HcE:							
Heintooga, very stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
HcE:							
Chiltoskie, very stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
HpA:							
Hemphill, rarely flooded	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	0.40	Flooding	0.40		
IoA:							
Iotla, occasionally flooded	85	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	0.95
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Seepage	1.00		
JbB:							
Junaluska	50	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Brasstown	40	Very limited		Somewhat limited		Somewhat limited	
		Depth to bedrock	1.00	Depth to bedrock	0.84	Depth to bedrock	0.84
JbC:							
Junaluska	50	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50
Brasstown	40	Very limited		Somewhat limited		Somewhat limited	
		Depth to bedrock	1.00	Depth to bedrock	0.84	Depth to bedrock	0.84
		Slope	0.63	Slope	0.63	Slope	0.63
JbD:							
Junaluska	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00		
Brasstown	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	0.84	Depth to bedrock	0.84

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
JbE:							
Junaluska-----------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00		
Brasstown-----------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	0.84	Depth to bedrock	0.84
KsB:							
Kanuga--------------	50	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00			Hard to compact	1.00
						Depth to saturated zone	0.47
Swannanoa-----------	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00			Hard to compact	1.00
						Depth to saturated zone	0.95
KsC:							
Kanuga--------------	50	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00	Slope	0.37	Hard to compact	1.00
		Slope	0.37			Depth to saturated zone	0.47
						Slope	0.37
Swannanoa-----------	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00	Slope	0.37	Hard to compact	1.00
		Slope	0.37			Depth to saturated zone	0.95
						Slope	0.37
MvD:							
Mars Hill, stony----	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.77
		Seepage, bottom layer	1.00	Depth to bedrock	0.77	Seepage	0.50
Walnut, stony-------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
MvE:							
Mars Hill, stony----	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.77
		Seepage, bottom layer	1.00	Depth to bedrock	0.77	Seepage	0.50

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MvE:							
Walnut, stony-------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
MvF:							
Mars Hill, stony----	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.77
		Seepage, bottom layer	1.00	Depth to bedrock	0.77	Seepage	0.50
Walnut, stony-------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
MwD:							
Micaville, stony----	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.32	Depth to bedrock	0.32
						Gravel content	0.11
Brownwood, stony----	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
MwE:							
Micaville, stony----	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.32	Depth to bedrock	0.32
						Gravel content	0.11
Brownwood, stony----	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
MwF:							
Micaville, stony----	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.32	Depth to bedrock	0.32
						Gravel content	0.11
Brownwood, stony----	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
NkA:							
Nikwasi, frequently flooded	70	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Ponding	1.00	Depth to saturated zone	1.00
		Ponding	1.00	Depth to saturated zone	1.00	Too sandy	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	1.00
		Too sandy	1.00			Gravel content	0.68
NtD:							
Northcove, very stony	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Maymead, very stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
NtE:							
Northcove, very stony	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
Maymead, very stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
OwC:							
Oconaluftee, windswept	45	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
		Slope	0.37	Slope	0.37	Slope	0.37
Guyot, windswept	25	Very limited		Very limited		Somewhat limited	
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Slope	0.37	Slope	0.37
		Slope	0.37	Depth to bedrock	0.14	Depth to bedrock	0.14

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
OwC:							
Cataloochee, windswept----------	20	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too acid	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Slope	0.37	Slope	0.37
		Slope	0.37				
OwD:							
Oconaluftee, windswept----------	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Guyot, windswept----	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.14	Depth to bedrock	0.14
Cataloochee, windswept----------	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too acid	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00				
OwE:							
Oconaluftee, windswept----------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Guyot, windswept----	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.14	Depth to bedrock	0.14
Cataloochee, windswept----------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too acid	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00				
OwF:							
Oconaluftee, windswept----------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
OwF:							
Guyot, windswept----	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.14	Depth to bedrock	0.14
Cataloochee, windswept----------	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Too acid	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00				
Pg:							
Pits, gravel--------	100	Not rated		Not rated		Not rated	
Pt:							
Pits, quarry--------	90	Not rated		Not rated		Not rated	
PwC:							
Porters, stony------	45	Very limited		Very limited		Somewhat limited	
		Depth to bedrock	1.00	Seepage	1.00	Slope	0.63
		Seepage, bottom layer	1.00	Slope	0.63	Seepage	0.50
				Depth to bedrock	0.14	Depth to bedrock	0.14
		Slope	0.63			Gravel content	0.01
Unaka, stony--------	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
				Slope	0.63	Seepage	0.50
		Slope	0.63				
PwD:							
Porters, stony------	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.14	Depth to bedrock	0.14
						Gravel content	0.01
Unaka, stony--------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
PwE:							
Porters, stony------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.14	Depth to bedrock	0.14
						Gravel content	0.01
Unaka, stony--------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
PxF:							
Porters, rocky	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.14	Depth to bedrock	0.14
						Gravel content	0.01
Unaka, rocky	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
RdA:							
Reddies, occasionally flooded	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Depth to saturated zone	0.24
		Too sandy	1.00			Gravel content	0.13
RkF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Cleveland, very bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
RoF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Oteen, very bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
						Gravel content	0.01
RsA:							
Rosman, occasionally flooded	80	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Seepage	0.50
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		
		Seepage, bottom layer	1.00	Seepage	1.00		
SoD:							
Soco, stony	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
SoD:							
Stecoah, stony	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.84
		Seepage, bottom layer	1.00	Depth to bedrock	0.84	Seepage	0.50
SoE:							
Soco, stony	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Stecoah, stony	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage, bottom layer	1.00	Depth to bedrock	0.42	Depth to bedrock	0.42
SoF:							
Soco, stony	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Stecoah, stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.84
		Seepage, bottom layer	1.00	Depth to bedrock	0.84	Seepage	0.50
StB:							
Statler, rarely flooded	85	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Too clayey	0.50	Flooding	0.40		
		Flooding	0.40				
SyD:							
Sylco, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Gravel content	0.63
						Seepage	0.21
Soco, stony	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
SyE:							
Sylco, stony	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Gravel content	0.63
						Seepage	0.50

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
SyE:							
Soco, stony	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
SzF:							
Sylco, very stony	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Gravel content	0.63
						Seepage	0.50
Soco, very stony	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
TaB:							
Tate	85	Very limited		Not limited		Somewhat limited	
		Seepage, bottom layer	1.00			Too clayey	0.50
		Too clayey	0.50				
TaC:							
Tate	85	Very limited		Somewhat limited		Somewhat limited	
		Seepage, bottom layer	1.00	Slope	0.63	Slope	0.63
		Slope	0.63			Too clayey	0.50
		Too clayey	0.50				
TaD:							
Tate	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Too clayey	0.50
		Too clayey	0.50				
TkC:							
Tate, very stony	85	Very limited		Somewhat limited		Somewhat limited	
		Seepage, bottom layer	1.00	Slope	0.63	Slope	0.63
		Slope	0.63			Gravel content	0.04
TkD:							
Tate, very stony	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Gravel content	0.04
TmB:							
Tate	50	Very limited		Not limited		Somewhat limited	
		Seepage, bottom layer	1.00			Too clayey	0.50
		Too clayey	0.50				
Urban land	40	Not rated		Not rated		Not rated	

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
TmC:							
Tate	50	Very limited		Somewhat limited		Somewhat limited	
		Seepage, bottom layer	1.00	Slope	0.63	Slope	0.63
		Slope	0.63			Too clayey	0.50
		Too clayey	0.50				
Urban land	40	Not rated		Not rated		Not rated	
TmD:							
Tate	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Too clayey	0.50
		Too clayey	0.50				
Urban land	40	Not rated		Not rated		Not rated	
TnE:							
Toecane, extremely bouldery	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
		Too sandy	0.50			Too sandy	0.50
ToC:							
Toecane, bouldery	50	Very limited		Very limited		Very limited	
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00	Slope	0.63	Slope	0.63
		Slope	0.63			Seepage	0.50
		Too sandy	0.50			Too sandy	0.50
Tusquitee, bouldery	40	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50
TpD:							
Toecane, very bouldery	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
		Too sandy	0.50			Too sandy	0.50
Tusquitee, very bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
TpE:							
Toecane, very bouldery	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
		Too sandy	0.50			Too sandy	0.50
Tusquitee, very bouldery	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
TsA:							
Toxaway, frequently flooded	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00		
TtE:							
Trimont, stony	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
TuD:							
Tusquitee, stony	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Toecane, stony	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Large stones	1.00	Seepage	1.00	Large stones	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
		Too sandy	0.50			Too sandy	0.50
TwB:							
Tusquitee	55	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Whiteside	35	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.47
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.21

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
TwC:							
Tusquitee----------	55	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50
Whiteside----------	35	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	0.63
		Seepage, bottom layer	1.00	Seepage	1.00	Depth to saturated zone	0.47
		Slope	0.63	Slope	0.63	Seepage	0.21
UcB:							
Udifluvents, frequently flooded-	95	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Seepage	1.00		
		Too sandy	1.00				
Ud:							
Udorthents, loamy---	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.01	Slope	0.01	Slope	0.01
UfB:							
Udorthents, occasionally flooded-----------	60	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Seepage	0.21
		Seepage, bottom layer	1.00	Seepage	1.00		
Urban land, occasionally flooded-----------	30	Not rated		Not rated		Not rated	
UhE:							
Udorthents, rocky---	55	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.21
Urban land----------	40	Not rated		Not rated		Not rated	
UkD:							
Unaka, very bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Rock outcrop--------	35	Not rated		Not rated		Not rated	

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
UkE:							
Unaka, very bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Rock outcrop--------	35	Not rated		Not rated		Not rated	
UkF:							
Unaka, very bouldery	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Rock outcrop--------	35	Not rated		Not rated		Not rated	
UnB:							
Unison--------------	90	Very limited		Not limited		Very limited	
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
UnC:							
Unison--------------	80	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Seepage, bottom layer	1.00			Hard to compact	1.00
						Slope	0.63
		Slope	0.63				
UnD:							
Unison--------------	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Too clayey	1.00			Too clayey	1.00
		Seepage, bottom layer	1.00				
UrB:							
Unison--------------	60	Very limited		Not limited		Very limited	
		Too clayey	1.00			Too clayey	1.00
Urban land----------	30	Not rated		Not rated		Not rated	
UrC:							
Unison--------------	60	Very limited		Somewhat limited		Very limited	
		Too clayey	1.00	Slope	0.63	Too clayey	1.00
		Slope	0.63			Slope	0.63
Urban land----------	30	Not rated		Not rated		Not rated	
Ux:							
Urban land----------	90	Not rated		Not rated		Not rated	
W:							
Water---------------	100	Not rated		Not rated		Not rated	

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
WaC2:							
Walnut, moderately eroded	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50
Oteen, moderately eroded	35	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Slope	0.63	Slope	0.63
		Slope	0.63			Seepage	0.50
						Gravel content	0.01
Mars Hill, moderately eroded	20	Very limited		Very limited		Somewhat limited	
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.77
		Seepage, bottom layer	1.00	Depth to bedrock	0.77	Slope	0.63
		Slope	0.63	Slope	0.63	Seepage	0.50
WaD2:							
Walnut, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Oteen, moderately eroded	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
						Gravel content	0.01
Mars Hill, moderately eroded	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.77
		Seepage, bottom layer	1.00	Depth to bedrock	0.77	Seepage	0.50
WaE2:							
Walnut, moderately eroded	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Oteen, moderately eroded	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
						Gravel content	0.01

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
WaE2:							
Mars Hill, moderately eroded--	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.77
		Seepage, bottom layer	1.00	Depth to bedrock	0.77	Seepage	0.50
WnF:							
Walnut--------------	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Oteen---------------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00			Seepage	0.50
						Gravel content	0.01
Rock outcrop--------	20	Not rated		Not rated		Not rated	
WoE:							
Wayah, bouldery-----	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Burton, bouldery----	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
WpF:							
Wayah, very rocky---	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Burton, very rocky--	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
WrC:							
Wayah, windswept----	50	Very limited		Very limited		Somewhat limited	
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
				Slope	0.63	Seepage	0.50
		Slope	0.63				
Burton, windswept---	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Slope	0.63
				Slope	0.63	Seepage	0.50
		Slope	0.63				

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
WrD:							
Wayah, windswept----	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Burton, windswept---	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
WrE:							
Wayah, windswept----	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Burton, windswept---	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
WsF:							
Wayah, windswept----	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
Burton, windswept---	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00	Seepage	0.50
WtB:							
Whiteside-----------	90	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.47
		Seepage, bottom layer	1.00				
WtC:							
Whiteside-----------	90	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	0.63
		Seepage, bottom layer	1.00	Slope	0.63	Depth to saturated zone	0.47
		Slope	0.63				
ZcB:							
Zillicoa------------	85	Very limited		Somewhat limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	0.61	Too clayey	1.00
		Too clayey	1.00			Hard to compact	1.00
						Depth to bedrock	0.61

Table 12.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
ZcC:							
Zillicoa------------	85	Very limited		Somewhat limited		Very limited	
		Depth to bedrock	1.00	Slope	0.63	Too clayey	1.00
		Too clayey	1.00	Depth to bedrock	0.61	Hard to compact	1.00
		Slope	0.63			Slope	0.63
						Depth to bedrock	0.61
ZoD:							
Zillicoa, stony-----	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	0.61	Too clayey	1.00
		Too clayey	1.00			Hard to compact	1.00
						Depth to bedrock	0.61

Table 13.—Construction Materials, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
AcD:					
Ashe, very stony----	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.02
		Thickest layer	0.00	Bottom layer	0.03
Cleveland, very stony--------------	30	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Rock outcrop--------	20	Not rated		Not rated	
ArE:					
Ashe, very bouldery-	40	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.03
Cleveland, very bouldery-----------	30	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Rock outcrop--------	20	Not rated		Not rated	
ArF:					
Ashe, very bouldery-	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.02
		Thickest layer	0.00	Bottom layer	0.03
Cleveland, very bouldery-----------	30	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Rock outcrop--------	20	Not rated		Not rated	
BaD:					
Balsam, extremely bouldery-----------	60	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Tanasee, extremely bouldery-----------	30	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Potential source of gravel: Value	Potential source of sand: Rating class	Potential source of sand: Value
BaE:					
Balsam, extremely bouldery	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Tanasee, extremely bouldery	30	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
BeA:					
Biltmore, occasionally flooded	90	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.08
		Thickest layer	0.00	Bottom layer	0.86
BkB2:					
Braddock, moderately eroded	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
BkC2:					
Braddock, moderately eroded	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
BkD2:					
Braddock, moderately eroded	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
BnB:					
Braddock	40	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Urban land	30	Not rated		Not rated	
BnC:					
Braddock	40	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Urban land	30	Not rated		Not rated	
BpF:					
Breakneck, windswept	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Pullback, windswept	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
BwD:					
Burton, windswept---	50	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
Craggey, windswept--	40	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
BxE:					
Burton, windswept---	45	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
Craggey, windswept--	30	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.02
		Bottom layer	0.00	Thickest layer	0.02
Rock outcrop--------	20	Not rated		Not rated	
BxF:					
Burton, windswept---	45	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.02
Craggey, windswept--	30	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
Rock outcrop--------	20	Not rated		Not rated	
CaE:					
Cataska, very rocky-	45	Not rated		Poor	
				Thickest layer	0.00
				Bottom layer	0.00
Sylco, very rocky---	40	Not rated		Poor	
				Bottom layer	0.00
				Thickest layer	0.00
CdF:					
Cataska, very stony-	40	Not rated		Poor	
				Bottom layer	0.00
				Thickest layer	0.00
Sylco, very stony---	30	Not rated		Poor	
				Bottom layer	0.00
				Thickest layer	0.00
Rock outcrop--------	20	Not rated		Not rated	
ChD:					
Cheoah, stony-------	55	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Jeffrey, stony------	30	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
ChE:					
Cheoah, stony	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Jeffrey, stony	30	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
ChF:					
Cheoah, stony	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Jeffrey, stony	30	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
CkB2:					
Clifton, moderately eroded	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
CkC2:					
Clifton, moderately eroded	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
CkD2:					
Clifton, moderately eroded	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
CkE2:					
Clifton, moderately eroded	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
CsB:					
Clifton, stony	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
CsC:					
Clifton, stony	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
CsD:					
Clifton, stony	85	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
CuB:					
Clifton-------------	50	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Urban land----------	40	Not rated		Not rated	
CuC:					
Clifton-------------	50	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Urban land----------	40	Not rated		Not rated	
CuD:					
Clifton-------------	50	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Urban land----------	40	Not rated		Not rated	
CxE:					
Craggey, windswept--	50	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
Rock outcrop--------	20	Not rated		Not rated	
Clingman, windswept-	25	Not rated		Not rated	
CxF:					
Craggey, windswept--	50	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.02
Rock outcrop--------	20	Not rated		Not rated	
Clingman, windswept-	25	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.12
DAM:					
Dam-----------------	100	Not rated		Not rated	
DeA:					
Dellwood, occasionally flooded------------	60	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.03
Reddies, occasionally flooded------------	30	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.26

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
DrB:					
Dillard, rarely flooded	80	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
EdC:					
Edneyville, stony	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.02
		Thickest layer	0.00	Bottom layer	0.04
Chestnut, stony	25	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
EdD:					
Edneyville, stony	50	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.02
		Thickest layer	0.00	Bottom layer	0.04
Chestnut, stony	35	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
EdE:					
Edneyville, stony	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.02
		Thickest layer	0.00	Bottom layer	0.04
Chestnut, stony	25	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
EdF:					
Edneyville, stony	45	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.02
		Thickest layer	0.00	Bottom layer	0.04
Chestnut, stony	35	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
EvD2:					
Evard, moderately eroded	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Cowee, moderately eroded	35	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
EvE2:					
Evard, moderately eroded	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value
EvE2:					
Cowee, moderately eroded	35	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
EvF2:					
Evard, moderately eroded	50	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
Cowee, moderately eroded	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
EwC:					
Evard, stony	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Cowee, stony	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
EwD:					
Evard, stony	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Cowee, stony	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
EwE:					
Evard, stony	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Cowee, stony	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
EwF:					
Evard, stony	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Cowee, stony	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
ExC:					
Evard	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
ExC:					
Cowee	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land	20	Not rated		Not rated	
ExD:					
Evard	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Cowee	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land	20	Not rated		Not rated	
ExE:					
Evard	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Cowee	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land	20	Not rated		Not rated	
FaC2:					
Fannin, moderately eroded	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.03
Lauada, moderately eroded	25	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
FaD2:					
Fannin, moderately eroded	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.03
Lauada, moderately eroded	25	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
FaE2:					
Fannin, moderately eroded	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.03
Lauada, moderately eroded	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
FnB:					
Fannin, moderately eroded	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.03
Lauada, moderately eroded	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land	20	Not rated		Not rated	
FnC:					
Fannin, moderately eroded	40	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.03
Lauada, moderately eroded	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land	20	Not rated		Not rated	
FnD:					
Fannin, moderately eroded	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.03
Lauada, moderately eroded	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land	20	Not rated		Not rated	
FrA:					
French, occasionally flooded	90	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.14
HcE:					
Heintooga, very stony	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Chiltoskie, very stony	35	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value
HpA:					
Hemphill, rarely flooded-----------	75	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
IoA:					
Iotla, occasionally flooded-----------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
JbB:					
Junaluska-----------	50	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.01
Brasstown-----------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
JbC:					
Junaluska-----------	50	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.01
Brasstown-----------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
JbD:					
Junaluska-----------	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Brasstown-----------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
JbE:					
Junaluska-----------	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Brasstown-----------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
KsB:					
Kanuga--------------	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Swannanoa-----------	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
KsC:					
Kanuga	50	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
Swannanoa	35	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
MvD:					
Mars Hill, stony	55	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
Walnut, stony	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
MvE:					
Mars Hill, stony	55	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
Walnut, stony	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
MvF:					
Mars Hill, stony	55	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
Walnut, stony	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
MwD:					
Micaville, stony	45	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.05
Brownwood, stony	35	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
MwE:					
Micaville, stony	50	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.03
		Bottom layer	0.00	Thickest layer	0.05
Brownwood, stony	30	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
MwF:					
Micaville, stony	40	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.05

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value
MwF:					
Brownwood, stony----	35	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
NkA:					
Nikwasi, frequently flooded-----------	70	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.14
NtD:					
Northcove, very stony--------------	60	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.03
Maymead, very stony-	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
NtE:					
Northcove, very stony--------------	45	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.03
Maymead, very stony-	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
OwC:					
Oconaluftee, windswept----------	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Guyot, windswept----	25	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
Cataloochee, windswept----------	20	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.01
		Thickest layer	0.00	Bottom layer	0.01
OwD:					
Oconaluftee, windswept----------	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Guyot, windswept----	25	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value
OwD:					
Cataloochee, windswept----------	20	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
OwE:					
Oconaluftee, windswept----------	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Guyot, windswept----	30	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
Cataloochee, windswept----------	25	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
OwF:					
Oconaluftee, windswept----------	40	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Guyot, windswept----	35	Poor		Fair	
		Thickest layer	0.00	Bottom layer	0.01
		Bottom layer	0.00	Thickest layer	0.01
Cataloochee, windswept----------	25	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.01
		Thickest layer	0.00	Thickest layer	0.01
Pg:					
Pits, gravel--------	100	Not rated		Not rated	
Pt:					
Pits, quarry--------	90	Not rated		Not rated	
PwC:					
Porters, stony------	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Unaka, stony--------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
PwD:					
Porters, stony------	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Unaka, stony--------	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
PwE:					
Porters, stony	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Unaka, stony	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
PxF:					
Porters, rocky	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Unaka, rocky	35	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
RdA:					
Reddies, occasionally flooded	80	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.26
RkF:					
Rock outcrop	60	Not rated		Not rated	
Cleveland, very bouldery	30	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
RoF:					
Rock outcrop	60	Not rated		Not rated	
Oteen, very bouldery	30	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
RsA:					
Rosman, occasionally flooded	80	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
SoD:					
Soco, stony	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Stecoah, stony	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
SoE:					
Soco, stony	65	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
SoE:					
Stecoah, stony------	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
SoF:					
Soco, stony---------	45	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Stecoah, stony------	35	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
StB:					
Statler, rarely flooded-----------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
SyD:					
Sylco, stony--------	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Soco, stony---------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
SyE:					
Sylco, stony--------	55	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Soco, stony---------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
SzF:					
Sylco, very stony---	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Soco, very stony----	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
TaB:					
Tate----------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
TaC:					
Tate----------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
TaD:					
Tate----------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
TkC:					
Tate, very stony----	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
TkD:					
Tate, very stony----	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
TmB:					
Tate----------------	50	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.01
Urban land----------	40	Not rated		Not rated	
TmC:					
Tate----------------	50	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.01
Urban land----------	40	Not rated		Not rated	
TmD:					
Tate----------------	50	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.01
Urban land----------	40	Not rated		Not rated	
TnE:					
Toecane, extremely bouldery-----------	85	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
ToC:					
Toecane, bouldery---	50	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
Tusquitee, bouldery-	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.01
TpD:					
Toecane, very bouldery-----------	50	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
Tusquitee, very bouldery-----------	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value
TpE:					
Toecane, very bouldery	55	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
Tusquitee, very bouldery	35	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.02
TsA:					
Toxaway, frequently flooded	80	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
TtE:					
Trimont, stony	85	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.01
TuD:					
Tusquitee, stony	65	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
Toecane, stony	25	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
TwB:					
Tusquitee	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
Whiteside	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.01
TwC:					
Tusquitee	55	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
Whiteside	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.01
UcB:					
Udifluvents, frequently flooded	95	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.86
		Thickest layer	0.00	Thickest layer	0.86

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
Ud:					
Udorthents, loamy---	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
UfB:					
Udorthents, occasionally flooded-----------	60	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.03
Urban land, occasionally flooded-----------	30	Not rated		Not rated	
UhE:					
Udorthents, rocky---	55	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.03
Urban land----------	40	Not rated		Not rated	
UkD:					
Unaka, very bouldery	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Rock outcrop--------	35	Not rated		Not rated	
UkE:					
Unaka, very bouldery	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Rock outcrop--------	35	Not rated		Not rated	
UkF:					
Unaka, very bouldery	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Rock outcrop--------	35	Not rated		Not rated	
UnB:					
Unison--------------	90	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
UnC:					
Unison--------------	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
UnD:					
Unison--------------	80	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
UrB:					
Unison	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land	30	Not rated		Not rated	
UrC:					
Unison	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land	30	Not rated		Not rated	
Ux:					
Urban land	90	Not rated		Not rated	
W:					
Water	100	Not rated		Not rated	
WaC2:					
Walnut, moderately eroded	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
Oteen, moderately eroded	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Mars Hill, moderately eroded	20	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
WaD2:					
Walnut, moderately eroded	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
Oteen, moderately eroded	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Mars Hill, moderately eroded	20	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
WaE2:					
Walnut, moderately eroded	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
WaE2:					
Oteen, moderately eroded------------	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Mars Hill, moderately eroded--	20	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.02
WnF:					
Walnut--------------	45	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
Oteen---------------	35	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
Rock outcrop--------	20	Not rated		Not rated	
WoE:					
Wayah, bouldery-----	50	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.04
Burton, bouldery----	40	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.04
		Thickest layer	0.00	Thickest layer	0.04
WpF:					
Wayah, very rocky---	50	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.04
Burton, very rocky--	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.04
		Thickest layer	0.00	Bottom layer	0.04
WrC:					
Wayah, windswept----	50	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.04
Burton, windswept---	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
WrD:					
Wayah, windswept----	50	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.04
Burton, windswept---	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02

Table 13.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
WrE:					
Wayah, windswept----	50	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.04
Burton, windswept---	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
WsF:					
Wayah, windswept----	60	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.04
Burton, windswept---	30	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
WtB:					
Whiteside-----------	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
WtC:					
Whiteside-----------	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
ZcB:					
Zillicoa------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
ZcC:					
Zillicoa------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
ZoD:					
Zillicoa, stony-----	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 13.—Construction Materials, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
AcD:							
Ashe, very stony----	40	Fair		Poor		Poor	
		Droughty	0.13	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.08	Depth to bedrock	0.54
		Organic matter content low	0.50			Rock fragments	0.76
						Too acid	0.76
		Depth to bedrock	0.54				
Cleveland, very stony--------------	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.08	Depth to bedrock	0.00
		Organic matter content low	0.50			Rock fragments	0.68
						Too acid	0.98
		Too acid	0.54				
Rock outcrop--------	20	Not rated		Not rated		Not rated	
ArE:							
Ashe, very bouldery-	40	Fair		Poor		Poor	
		Droughty	0.13	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.00	Depth to bedrock	0.54
						Rock fragments	0.76
		Too acid	0.50			Too acid	0.76
		Depth to bedrock	0.54				
Cleveland, very bouldery-----------	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Organic matter content low	0.50			Rock fragments	0.68
						Too acid	0.98
		Too acid	0.54				
Rock outcrop--------	20	Not rated		Not rated		Not rated	
ArF:							
Ashe, very bouldery-	40	Fair		Poor		Poor	
		Droughty	0.13	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Depth to bedrock	0.54
		Organic matter content low	0.50			Rock fragments	0.76
						Too acid	0.76
		Depth to bedrock	0.54				
Cleveland, very bouldery-----------	30	Poor		Poor		Poor	
		Depth to bedrock	0.00	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.00	Slope	0.00	Depth to bedrock	0.00
		Organic matter content low	0.50			Rock fragments	0.68
						Too acid	0.98
		Too acid	0.54				
Rock outcrop--------	20	Not rated		Not rated		Not rated	

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
BaD:							
Balsam, extremely bouldery	60	Poor		Poor		Poor	
		Stone content	0.00	Cobble content	0.00	Rock fragments	0.00
		Organic matter content low	0.12	Stone content	0.00	Hard to reclaim (rock fragments)	0.00
		Too acid	0.20	Slope	0.08	Slope	0.00
		Cobble content	0.57			Too acid	0.76
Tanasee, extremely bouldery	30	Fair		Fair		Poor	
		Organic matter content low	0.12	Slope	0.08	Slope	0.00
		Too acid	0.50			Too acid	0.50
						Rock fragments	0.68
						Hard to reclaim (rock fragments)	0.74
BaE:							
Balsam, extremely bouldery	60	Poor		Poor		Poor	
		Stone content	0.00	Slope	0.00	Slope	0.00
		Organic matter content low	0.12	Cobble content	0.00	Hard to reclaim (rock fragments)	0.00
		Too acid	0.20	Stone content	0.00	Rock fragments	0.00
		Cobble content	0.57			Too acid	0.76
Tanasee, extremely bouldery	30	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
		Too acid	0.50			Too acid	0.50
						Rock fragments	0.68
						Hard to reclaim (rock fragments)	0.74
BeA:							
Biltmore, occasionally flooded	90	Poor		Good		Poor	
		Too sandy	0.00			Too sandy	0.00
		Wind erosion	0.00			Rock fragments	0.99
		Organic matter content low	0.12				
BkB2:							
Braddock, moderately eroded	80	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.12	Shrink-swell	0.90	Too acid	0.59
		Organic matter content low	0.50			Rock fragments	0.68
BkC2:							
Braddock, moderately eroded	80	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.12	Shrink-swell	0.90	Slope	0.37
		Organic matter content low	0.50			Too acid	0.59
						Rock fragments	0.68

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
BkD2:							
Braddock, moderately eroded	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.12	Slope	0.08	Slope	0.00
		Organic matter content low	0.50	Shrink-swell	0.90	Too acid	0.59
						Rock fragments	0.68
BnB:							
Braddock	40	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.12	Shrink-swell	0.96	Too acid	0.59
		Organic matter content low	0.50			Rock fragments	0.68
Urban land	30	Not rated		Not rated		Not rated	
BnC:							
Braddock	40	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.12	Shrink-swell	0.90	Slope	0.37
		Organic matter content low	0.50			Too acid	0.59
						Rock fragments	0.68
Urban land	30	Not rated		Not rated		Not rated	
BpF:							
Breakneck, windswept	55	Fair		Poor		Poor	
		Droughty	0.21	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.35	Slope	0.00	Rock fragments	0.04
		Too acid	0.50			Too acid	0.12
						Depth to bedrock	0.35
Pullback, windswept	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00			Too acid	0.12
		Too acid	0.50			Slope	0.50
						Rock fragments	0.76
BwD:							
Burton, windswept	50	Fair		Poor		Poor	
		Depth to bedrock	0.46	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.08	Depth to bedrock	0.46
		Droughty	0.72			Rock fragments	0.50
						Too acid	0.76
Craggey, windswept	40	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.08	Depth to bedrock	0.00
		Too acid	0.50			Too acid	0.50
						Rock fragments	0.76
BxE:							
Burton, windswept	45	Fair		Poor		Poor	
		Depth to bedrock	0.46	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.00	Depth to bedrock	0.46
		Droughty	0.72			Rock fragments	0.50
						Too acid	0.76

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
BxE:							
Craggey, windswept--	30	Poor		Poor		Poor	
		Droughty	0.00	Slope	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50			Too acid	0.50
						Rock fragments	0.76
Rock outcrop--------	20	Not rated		Not rated		Not rated	
BxF:							
Burton, windswept---	45	Fair		Poor		Poor	
		Depth to bedrock	0.46	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Depth to bedrock	0.46
		Droughty	0.72			Rock fragments	0.50
						Too acid	0.76
Craggey, windswept--	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Too acid	0.50			Too acid	0.50
						Rock fragments	0.76
Rock outcrop--------	20	Not rated		Not rated		Not rated	
CaE:							
Cataska, very rocky-	45	Poor		Poor		Not rated	
		Stone content	0.00	Depth to bedrock	0.00		
		Droughty	0.00	Slope	0.00		
		Depth to bedrock	0.00	Stone content	0.45		
		Too acid	0.50				
		Cobble content	0.85				
Sylco, very rocky---	40	Fair		Poor		Not rated	
		Droughty	0.23	Depth to bedrock	0.00		
		Stone content	0.26	Slope	0.00		
		Cobble content	0.40	Cobble content	0.15		
		Organic matter content low	0.50	Stone content	0.73		
		Too acid	0.50				
		Depth to bedrock	0.54				
CdF:							
Cataska, very stony-	40	Poor		Poor		Not rated	
		Droughty	0.00	Depth to bedrock	0.00		
		Depth to bedrock	0.00	Slope	0.00		
		Too acid	0.50				
		Cobble content	0.89				
		Stone content	0.92				
Sylco, very stony---	30	Poor		Poor		Not rated	
		Droughty	0.00	Low strength	0.00		
		Depth to bedrock	0.05	Slope	0.00		
		Stone content	0.40	Depth to bedrock	0.00		
		Too acid	0.50	Cobble content	0.78		
		Organic matter content low	0.50	Stone content	0.98		
		Cobble content	0.51				
Rock outcrop--------	20	Not rated		Not rated		Not rated	

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
ChD:							
Cheoah, stony-------	55	Fair		Fair		Poor	
		Organic matter content low	0.50	Slope	0.08	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.68	Too acid	0.50
		Water erosion	0.90				
Jeffrey, stony------	30	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.08	Too acid	0.50
		Depth to bedrock	0.65			Depth to bedrock	0.65
		Droughty	0.73				
		Water erosion	0.99				
ChE:							
Cheoah, stony-------	55	Fair		Poor		Poor	
		Organic matter content low	0.50	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.68	Too acid	0.50
		Water erosion	0.90				
Jeffrey, stony------	30	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.00	Too acid	0.50
		Depth to bedrock	0.65			Depth to bedrock	0.65
		Droughty	0.73				
		Water erosion	0.99				
ChF:							
Cheoah, stony-------	60	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.68	Too acid	0.50
		Water erosion	0.90				
Jeffrey, stony------	30	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.00	Too acid	0.50
		Depth to bedrock	0.65			Depth to bedrock	0.65
		Droughty	0.73				
		Water erosion	0.99				
CkB2:							
Clifton, moderately eroded-------------	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.91	Rock fragments	0.99
		Too acid	0.68				
CkC2:							
Clifton, moderately eroded-------------	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.91	Slope	0.37
		Too acid	0.68			Rock fragments	0.99

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
CkD2:							
Clifton, moderately eroded	80	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.08	Too clayey	0.00
				Shrink-swell	0.91	Rock fragments	0.99
		Too acid	0.68				
CkE2:							
Clifton, moderately eroded	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Slope	0.00	Slope	0.00
				Shrink-swell	0.91	Rock fragments	0.99
		Too acid	0.68				
CsB:							
Clifton, stony	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.91	Rock fragments	0.99
		Too acid	0.68				
CsC:							
Clifton, stony	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.91	Slope	0.37
						Rock fragments	0.99
		Too acid	0.68				
CsD:							
Clifton, stony	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Slope	0.08	Slope	0.00
				Shrink-swell	0.91	Rock fragments	0.99
		Too acid	0.68				
CuB:							
Clifton	50	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.91	Rock fragments	0.99
		Too acid	0.68				
Urban land	40	Not rated		Not rated		Not rated	
CuC:							
Clifton	50	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.91	Slope	0.37
						Rock fragments	0.99
		Too acid	0.68				
Urban land	40	Not rated		Not rated		Not rated	
CuD:							
Clifton	50	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.08	Too clayey	0.00
				Shrink-swell	0.91	Rock fragments	0.99
		Too acid	0.68				

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
CuD:							
Urban land	40	Not rated		Not rated		Not rated	
CxE:							
Craggey, windswept	50	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Too acid	0.50			Too acid	0.50
						Rock fragments	0.76
Rock outcrop	20	Not rated		Not rated		Not rated	
Clingman, windswept	25	Poor		Poor		Not rated	
		Depth to bedrock	0.00	Depth to bedrock	0.00		
		Too acid	0.50	Slope	0.00		
CxF:							
Craggey, windswept	50	Poor		Poor		Poor	
		Depth to bedrock	0.00	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.00	Slope	0.00	Depth to bedrock	0.00
		Too acid	0.50			Too acid	0.50
						Rock fragments	0.76
Rock outcrop	20	Not rated		Not rated		Not rated	
Clingman, windswept	25	Poor		Poor		Not rated	
		Depth to bedrock	0.00	Depth to bedrock	0.00		
		Too acid	0.50	Slope	0.00		
DAM:							
Dam	100	Not rated		Not rated		Not rated	
DeA:							
Dellwood, occasionally flooded	60	Poor		Fair		Poor	
		Too sandy	0.00	Cobble content	0.52	Too sandy	0.00
		Droughty	0.12			Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12			Rock fragments	0.00
		Too acid	0.88				
		Cobble content	0.95				
Reddies, occasionally flooded	30	Fair		Fair		Poor	
		Organic matter content low	0.12	Wetness depth	0.98	Hard to reclaim (rock fragments)	0.00
		Too acid	0.88			Rock fragments	0.82
		Droughty	0.97			Wetness depth	0.98
DrB:							
Dillard, rarely flooded	80	Fair		Poor		Fair	
		Too acid	0.32	Low strength	0.00	Too acid	0.88
		Organic matter content low	0.50	Wetness depth	0.89	Wetness depth	0.89

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
EdC:							
Edneyville, stony---	55	Fair		Good		Fair	
		Too acid	0.08			Slope	0.37
		Organic matter content low	0.50			Too acid	0.50
						Rock fragments	0.68
						Hard to reclaim (rock fragments)	0.98
Chestnut, stony-----	25	Fair		Poor		Poor	
		Droughty	0.09	Depth to bedrock	0.00	Rock fragments	0.00
		Too acid	0.50			Slope	0.37
		Organic matter content low	0.50			Too acid	0.76
		Depth to bedrock	0.93			Depth to bedrock	0.93
EdD:							
Edneyville, stony---	50	Fair		Fair		Poor	
		Too acid	0.08	Slope	0.08	Slope	0.00
		Organic matter content low	0.50			Too acid	0.50
						Rock fragments	0.68
						Hard to reclaim (rock fragments)	0.98
Chestnut, stony-----	35	Fair		Poor		Poor	
		Droughty	0.09	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.08	Rock fragments	0.00
		Organic matter content low	0.50			Too acid	0.76
		Depth to bedrock	0.93			Depth to bedrock	0.93
EdE:							
Edneyville, stony---	55	Fair		Poor		Poor	
		Too acid	0.08	Slope	0.00	Slope	0.00
		Organic matter content low	0.50			Too acid	0.50
						Rock fragments	0.68
						Hard to reclaim (rock fragments)	0.98
Chestnut, stony-----	25	Fair		Poor		Poor	
		Droughty	0.09	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.00
		Organic matter content low	0.50			Too acid	0.76
		Depth to bedrock	0.93			Depth to bedrock	0.93
EdF:							
Edneyville, stony---	45	Fair		Poor		Poor	
		Too acid	0.08	Slope	0.00	Slope	0.00
		Organic matter content low	0.50			Too acid	0.50
						Rock fragments	0.68
						Hard to reclaim (rock fragments)	0.98
Chestnut, stony-----	35	Fair		Poor		Poor	
		Droughty	0.09	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.00
		Organic matter content low	0.50			Too acid	0.76
		Depth to bedrock	0.93			Depth to bedrock	0.93

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
EvD2:							
Evard, moderately eroded	55	Fair		Fair		Poor	
		Organic matter content low	0.12	Slope	0.08	Slope	0.00
						Rock fragments	0.95
		Too acid	0.54			Too acid	0.98
Cowee, moderately eroded	35	Fair		Poor		Poor	
		Droughty	0.23	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.26	Slope	0.08	Rock fragments	0.00
		Organic matter content low	0.50			Depth to bedrock	0.26
						Too acid	0.76
		Too acid	0.50				
EvE2:							
Evard, moderately eroded	55	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
						Rock fragments	0.95
		Too acid	0.54			Too acid	0.98
Cowee, moderately eroded	35	Fair		Poor		Poor	
		Droughty	0.23	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Rock fragments	0.00
		Too acid	0.50			Depth to bedrock	0.26
		Organic matter content low	0.50			Too acid	0.76
EvF2:							
Evard, moderately eroded	50	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
						Rock fragments	0.95
		Too acid	0.54			Too acid	0.98
Cowee, moderately eroded	30	Fair		Poor		Poor	
		Droughty	0.23	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Rock fragments	0.00
		Too acid	0.50			Depth to bedrock	0.26
		Organic matter content low	0.50			Too acid	0.76
EwC:							
Evard, stony	55	Fair		Good		Fair	
		Organic matter content low	0.50			Slope	0.37
						Too clayey	0.60
		Too acid	0.54			Rock fragments	0.95
		Too clayey	0.92			Hard to reclaim (rock fragments)	0.98
						Too acid	0.98
Cowee, stony	25	Fair		Poor		Fair	
		Organic matter content low	0.50	Depth to bedrock	0.00	Slope	0.37
						Rock fragments	0.82
		Too acid	0.54			Too acid	0.98
		Depth to bedrock	0.99			Depth to bedrock	0.99
		Droughty	0.99				

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
EwD:							
Evard, stony--------	55	Fair		Fair		Poor	
		Organic matter content low	0.50	Slope	0.08	Slope	0.00
						Too clayey	0.60
		Too acid	0.54			Rock fragments	0.95
		Too clayey	0.92			Hard to reclaim (rock fragments)	0.98
						Too acid	0.98
Cowee, stony--------	25	Fair		Poor		Poor	
		Organic matter content low	0.50	Depth to bedrock	0.00	Slope	0.00
				Slope	0.08	Rock fragments	0.82
		Too acid	0.54			Too acid	0.98
		Depth to bedrock	0.99			Depth to bedrock	0.99
		Droughty	0.99				0.99
EwE:							
Evard, stony--------	55	Fair		Poor		Poor	
		Organic matter content low	0.50	Slope	0.00	Slope	0.00
						Too clayey	0.60
		Too acid	0.54			Rock fragments	0.95
		Too clayey	0.92			Hard to reclaim (rock fragments)	0.95
						Too acid	0.98
Cowee, stony--------	25	Fair		Poor		Poor	
		Organic matter content low	0.50	Slope	0.00	Slope	0.00
				Depth to bedrock	0.00	Rock fragments	0.82
		Too acid	0.54			Too acid	0.98
		Depth to bedrock	0.99			Depth to bedrock	0.99
		Droughty	0.99				
EwF:							
Evard, stony--------	55	Fair		Poor		Poor	
		Organic matter content low	0.50	Slope	0.00	Slope	0.00
						Too clayey	0.60
		Too acid	0.54			Rock fragments	0.95
		Too clayey	0.92			Hard to reclaim (rock fragments)	0.98
						Too acid	0.98
Cowee, stony--------	25	Fair		Poor		Poor	
		Too acid	0.54	Slope	0.00	Slope	0.00
		Organic matter content low	0.88	Depth to bedrock	0.00	Rock fragments	0.00
						Too acid	0.98
		Depth to bedrock	0.99			Depth to bedrock	0.99
		Droughty	0.99				
ExC:							
Evard---------------	40	Fair		Good		Fair	
		Organic matter content low	0.12			Slope	0.37
						Rock fragments	0.95
		Too acid	0.54			Too acid	0.98
Cowee---------------	25	Fair		Poor		Poor	
		Droughty	0.23	Depth to bedrock	0.00	Rock fragments	0.00
		Depth to bedrock	0.26			Depth to bedrock	0.26
		Too acid	0.50			Slope	0.37
		Organic matter content low	0.50			Too acid	0.76

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
ExC:							
Urban land	20	Not rated		Not rated		Not rated	
ExD:							
Evard	40	Fair		Fair		Poor	
		Organic matter content low	0.12	Slope	0.08	Slope	0.00
						Rock fragments	0.95
		Too acid	0.54			Too acid	0.98
Cowee	25	Fair		Poor		Poor	
		Droughty	0.23	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.26	Slope	0.08	Rock fragments	0.00
		Too acid	0.50			Depth to bedrock	0.26
		Organic matter content low	0.50			Too acid	0.76
Urban land	20	Not rated		Not rated		Not rated	
ExE:							
Evard	40	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
						Rock fragments	0.95
		Too acid	0.54			Too acid	0.98
Cowee	30	Fair		Poor		Poor	
		Droughty	0.23	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Rock fragments	0.00
		Too acid	0.50			Depth to bedrock	0.26
		Organic matter content low	0.50			Too acid	0.76
Urban land	20	Not rated		Not rated		Not rated	
FaC2:							
Fannin, moderately eroded	55	Fair		Good		Fair	
		Organic matter content low	0.12			Slope	0.37
						Rock fragments	0.68
		Too acid	0.68				
Lauada, moderately eroded	25	Fair		Poor		Fair	
		Organic matter content low	0.50	Depth to bedrock	0.00	Slope	0.37
						Too clayey	0.60
		Too acid	0.61			Rock fragments	0.82
		Droughty	0.73			Depth to bedrock	0.84
		Depth to bedrock	0.84			Too acid	0.99
		Too clayey	0.92				
FaD2:							
Fannin, moderately eroded	55	Fair		Fair		Poor	
		Organic matter content low	0.12	Slope	0.08	Slope	0.00
						Rock fragments	0.68
		Too acid	0.68				

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
FaD2:							
Lauada, moderately eroded	25	Fair		Poor		Poor	
		Organic matter content low	0.50	Depth to bedrock	0.00	Slope	0.00
				Slope	0.08	Too clayey	0.60
		Too acid	0.61			Rock fragments	0.82
		Droughty	0.73			Depth to bedrock	0.84
		Depth to bedrock	0.84			Too acid	0.99
		Too clayey	0.92				
FaE2:							
Fannin, moderately eroded	55	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
						Rock fragments	0.68
		Too acid	0.68				
Lauada, moderately eroded	25	Fair		Poor		Poor	
		Organic matter content low	0.50	Depth to bedrock	0.00	Slope	0.00
				Slope	0.00	Too clayey	0.60
		Too acid	0.61			Rock fragments	0.82
		Droughty	0.73			Depth to bedrock	0.84
		Depth to bedrock	0.84			Too acid	0.99
		Too clayey	0.92				
FnB:							
Fannin, moderately eroded	40	Fair		Good		Fair	
		Organic matter content low	0.12			Rock fragments	0.68
		Too acid	0.68				
Lauada, moderately eroded	25	Fair		Poor		Fair	
		Organic matter content low	0.50	Depth to bedrock	0.00	Too clayey	0.60
						Rock fragments	0.82
		Too acid	0.61			Depth to bedrock	0.84
		Droughty	0.73			Too acid	0.99
		Depth to bedrock	0.84				
		Too clayey	0.92				
Urban land	20	Not rated		Not rated		Not rated	
FnC:							
Fannin, moderately eroded	40	Fair		Good		Fair	
		Organic matter content low	0.12			Slope	0.37
						Rock fragments	0.68
		Too acid	0.68				
Lauada, moderately eroded	25	Fair		Poor		Fair	
		Organic matter content low	0.50	Depth to bedrock	0.00	Slope	0.37
						Too clayey	0.60
		Too acid	0.61			Rock fragments	0.82
		Droughty	0.73			Depth to bedrock	0.84
		Depth to bedrock	0.84			Too acid	0.99
		Too clayey	0.92				
Urban land	20	Not rated		Not rated		Not rated	

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
FnD:							
Fannin, moderately eroded	40	Fair		Fair		Poor	
		Organic matter content low	0.12	Slope	0.08	Slope	0.00
						Rock fragments	0.68
		Too acid	0.68				
Lauada, moderately eroded	25	Fair		Poor		Poor	
		Organic matter content low	0.50	Depth to bedrock	0.00	Slope	0.00
				Slope	0.08	Too clayey	0.60
		Too acid	0.61			Rock fragments	0.82
		Droughty	0.73			Depth to bedrock	0.84
		Depth to bedrock	0.84			Too acid	0.99
		Too clayey	0.92				
Urban land	20	Not rated		Not rated		Not rated	
FrA:							
French, occasionally flooded	90	Fair		Fair		Poor	
		Organic matter content low	0.12	Wetness depth	0.29	Hard to reclaim (rock fragments)	0.00
		Too acid	0.84			Wetness depth	0.29
						Rock fragments	0.95
HcE:							
Heintooga, very stony	55	Poor		Poor		Poor	
		Stone content	0.00	Slope	0.00	Slope	0.00
		Cobble content	0.01	Stone content	0.00	Hard to reclaim	0.00
		Droughty	0.42				
		Organic matter content low	0.50	Cobble content	0.00	(rock fragments)	
						Rock fragments	0.00
		Too acid	0.50			Too acid	0.82
Chiltoskie, very stony	35	Poor		Poor		Poor	
		Too acid	0.00	Slope	0.00	Slope	0.00
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.00
						Too acid	0.59
						Rock fragments	0.97
HpA:							
Hemphill, rarely flooded	75	Fair		Poor		Poor	
		Too clayey	0.02	Wetness depth	0.00	Wetness depth	0.00
		Organic matter content low	0.50			Too clayey	0.01
		Too acid	0.88				

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
IoA:							
Iotla, occasionally flooded	85	Fair		Fair		Fair	
		Organic matter content low	0.12	Wetness depth	0.32	Wetness depth	0.32
		Too acid	0.97			Rock fragments	0.88
JbB:							
Junaluska	50	Fair		Poor		Fair	
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.69
		Organic matter content low	0.50	Stone content	0.99	Too acid	0.76
		Droughty	0.80			Depth to bedrock	0.93
		Depth to bedrock	0.93				
		Stone content	0.98				
Brasstown	40	Fair		Fair		Fair	
		Organic matter content low	0.50	Depth to bedrock	0.16	Too acid	0.76
		Too acid	0.50	Low strength	0.78	Rock fragments	0.99
		Water erosion	0.99			Hard to reclaim (rock fragments)	0.99
JbC:							
Junaluska	50	Fair		Poor		Fair	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.37
		Organic matter content low	0.50	Stone content	0.99	Rock fragments	0.69
		Droughty	0.80			Too acid	0.76
		Depth to bedrock	0.93			Depth to bedrock	0.93
		Stone content	0.98				
Brasstown	40	Fair		Fair		Fair	
		Too acid	0.50	Depth to bedrock	0.16	Slope	0.37
		Organic matter content low	0.50	Low strength	0.78	Too acid	0.76
		Water erosion	0.99			Rock fragments	0.99
						Hard to reclaim (rock fragments)	0.99
JbD:							
Junaluska	50	Fair		Poor		Poor	
		Depth to bedrock	0.21	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.28	Low strength	0.00	Depth to bedrock	0.21
		Too acid	0.50	Slope	0.08	Too acid	0.76
		Organic matter content low	0.50				
Brasstown	40	Fair		Poor		Poor	
		Too acid	0.50	Low strength	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.08	Too acid	0.76
		Water erosion	0.99	Depth to bedrock	0.16	Rock fragments	0.99
						Hard to reclaim (rock fragments)	0.99
JbE:							
Junaluska	50	Fair		Poor		Poor	
		Depth to bedrock	0.21	Slope	0.00	Slope	0.00
		Droughty	0.28	Depth to bedrock	0.00	Depth to bedrock	0.21
		Too acid	0.50	Low strength	0.00	Too acid	0.76
		Organic matter content low	0.50				

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
JbE:							
Brasstown	40	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Low strength	0.00	Too acid	0.76
				Depth to bedrock	0.16	Rock fragments	0.99
		Water erosion	0.99			Hard to reclaim (rock fragments)	0.99
KsB:							
Kanuga	50	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.32	Wetness depth	0.89	Hard to reclaim (rock fragments)	0.39
		Organic matter content low	0.50	Shrink-swell	0.90		
						Too acid	0.88
						Wetness depth	0.89
						Rock fragments	0.99
Swannanoa	35	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.32	Wetness depth	0.32	Wetness depth	0.32
		Organic matter content low	0.50	Shrink-swell	0.92	Hard to reclaim (rock fragments)	0.84
						Too acid	0.88
						Rock fragments	0.99
KsC:							
Kanuga	50	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.32	Wetness depth	0.89	Hard to reclaim (rock fragments)	0.39
		Organic matter content low	0.50	Shrink-swell	0.90		
						Slope	0.63
						Too acid	0.88
						Wetness depth	0.89
						Rock fragments	0.99
Swannanoa	35	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.32	Wetness depth	0.32	Wetness depth	0.32
		Organic matter content low	0.50	Shrink-swell	0.92	Slope	0.63
						Hard to reclaim (rock fragments)	0.84
						Too acid	0.88
						Rock fragments	0.99
MvD:							
Mars Hill, stony	55	Fair		Fair		Poor	
		Too acid	0.50	Slope	0.08	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.23	Rock fragments	0.76
						Too sandy	0.99
		Too sandy	0.99				
Walnut, stony	35	Fair		Poor		Poor	
		Droughty	0.10	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.26	Slope	0.08	Depth to bedrock	0.26
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
MvE:							
Mars Hill, stony----	55	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.23	Rock fragments	0.76
						Too sandy	0.99
		Too sandy	0.99				
Walnut, stony-------	35	Fair		Poor		Poor	
		Droughty	0.09	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Depth to bedrock	0.26
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				
MvF:							
Mars Hill, stony----	55	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.23	Rock fragments	0.76
						Too sandy	0.99
		Too sandy	0.99				
Walnut, stony-------	35	Fair		Poor		Poor	
		Droughty	0.10	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Depth to bedrock	0.26
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				
MwD:							
Micaville, stony----	45	Fair		Fair		Poor	
		Too acid	0.50	Slope	0.08	Rock fragments	0.00
		Organic matter content low	0.50	Depth to bedrock	0.68	Slope	0.00
						Too acid	0.76
						Hard to reclaim (rock fragments)	0.88
Brownwood, stony----	35	Fair		Poor		Poor	
		Droughty	0.04	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.29	Slope	0.08	Depth to bedrock	0.29
		Too acid	0.50			Rock fragments	0.32
		Organic matter content low	0.50			Too acid	0.88
		Water erosion	0.99				
MwE:							
Micaville, stony----	50	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.68	Rock fragments	0.00
						Too acid	0.76
						Hard to reclaim (rock fragments)	0.88
Brownwood, stony----	30	Fair		Poor		Poor	
		Droughty	0.04	Slope	0.00	Slope	0.00
		Depth to bedrock	0.29	Depth to bedrock	0.00	Depth to bedrock	0.29
		Too acid	0.50			Rock fragments	0.32
		Organic matter content low	0.50			Too acid	0.88
		Water erosion	0.99				

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MwF:							
Micaville, stony----	40	Fair		Poor		Poor	
		Organic matter content low	0.50	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.68	Rock fragments	0.00
						Too acid	0.76
						Hard to reclaim (rock fragments)	0.88
Brownwood, stony----	35	Fair		Poor		Poor	
		Droughty	0.04	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.29	Slope	0.00	Depth to bedrock	0.29
		Too acid	0.50			Rock fragments	0.32
		Organic matter content low	0.50			Too acid	0.88
		Water erosion	0.99				
NkA:							
Nikwasi, frequently flooded------------	70	Fair		Poor		Poor	
		Organic matter content low	0.12	Wetness depth	0.00	Wetness depth	0.00
		Too acid	0.68			Hard to reclaim (rock fragments)	0.00
						Rock fragments	0.82
NtD:							
Northcove, very stony--------------	60	Poor		Poor		Poor	
		Stone content	0.00	Stone content	0.00	Slope	0.00
		Too acid	0.20	Cobble content	0.00	Rock fragments	0.00
		Organic matter content low	0.50	Slope	0.08	Hard to reclaim (rock fragments)	0.00
		Cobble content	0.56			Too acid	0.76
Maymead, very stony-	30	Fair		Fair		Poor	
		Too acid	0.50	Slope	0.08	Slope	0.00
		Organic matter content low	0.50	Cobble content	0.99	Rock fragments	0.02
						Hard to reclaim (rock fragments)	0.18
						Too acid	0.88
NtE:							
Northcove, very stony--------------	45	Poor		Poor		Poor	
		Stone content	0.00	Slope	0.00	Slope	0.00
		Too acid	0.20	Stone content	0.00	Rock fragments	0.00
		Organic matter content low	0.50	Cobble content	0.00	Hard to reclaim (rock fragments)	0.00
		Cobble content	0.56			Too acid	0.76

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
NtE:							
Maymead, very stony-	35	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Cobble content	0.99	Rock fragments	0.02
						Hard to reclaim (rock fragments)	0.18
						Too acid	0.88
OwC:							
Oconaluftee, windswept----------	45	Fair		Good		Poor	
		Too acid	0.08			Rock fragments	0.00
		Organic matter content low	0.50			Too acid	0.50
						Slope	0.63
						Hard to reclaim (rock fragments)	0.76
Guyot, windswept----	25	Fair		Fair		Fair	
		Organic matter content low	0.12	Depth to bedrock	0.87	Too acid	0.59
		Too acid	0.50			Slope	0.63
						Hard to reclaim (rock fragments)	0.95
						Rock fragments	0.96
Cataloochee, windswept----------	20	Fair		Poor		Fair	
		Organic matter content low	0.12	Depth to bedrock	0.00	Rock fragments	0.18
		Too acid	0.50			Slope	0.63
		Depth to bedrock	0.65			Depth to bedrock	0.65
		Droughty	0.66			Too acid	0.76
OwD:							
Oconaluftee, windswept----------	45	Fair		Fair		Poor	
		Too acid	0.08	Slope	0.08	Slope	0.00
		Organic matter content low	0.50			Rock fragments	0.00
						Too acid	0.50
						Hard to reclaim (rock fragments)	0.76
Guyot, windswept----	25	Fair		Fair		Poor	
		Organic matter content low	0.12	Slope	0.08	Slope	0.00
				Depth to bedrock	0.87	Too acid	0.59
		Too acid	0.50			Hard to reclaim (rock fragments)	0.95
						Rock fragments	0.96
Cataloochee, windswept----------	20	Fair		Poor		Poor	
		Organic matter content low	0.12	Depth to bedrock	0.00	Slope	0.00
				Slope	0.08	Rock fragments	0.18
		Too acid	0.50			Depth to bedrock	0.65
		Depth to bedrock	0.65			Too acid	0.76
		Droughty	0.66				

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
OwE:							
Oconaluftee, windswept	35	Fair		Poor		Poor	
		Too acid	0.08	Slope	0.00	Slope	0.00
		Organic matter content low	0.50			Rock fragments	0.00
						Too acid	0.50
						Hard to reclaim (rock fragments)	0.76
Guyot, windswept	30	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.87	Too acid	0.59
						Hard to reclaim (rock fragments)	0.95
						Rock fragments	0.96
Cataloochee, windswept	25	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.18
		Depth to bedrock	0.65			Depth to bedrock	0.65
		Droughty	0.66			Too acid	0.76
OwF:							
Oconaluftee, windswept	40	Fair		Poor		Poor	
		Too acid	0.08	Slope	0.00	Slope	0.00
		Organic matter content low	0.50			Rock fragments	0.00
						Too acid	0.50
						Hard to reclaim (rock fragments)	0.76
Guyot, windswept	35	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.87	Too acid	0.59
						Hard to reclaim (rock fragments)	0.95
						Rock fragments	0.96
Cataloochee, windswept	25	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
		Too acid	0.50	Depth to bedrock	0.00	Rock fragments	0.18
		Depth to bedrock	0.65			Depth to bedrock	0.65
		Droughty	0.66			Too acid	0.76
Pg:							
Pits, gravel	100	Not rated		Not rated		Not rated	
Pt:							
Pits, quarry	90	Not rated		Not rated		Not rated	
PwC:							
Porters, stony	45	Fair		Fair		Fair	
		Organic matter content low	0.50	Depth to bedrock	0.87	Rock fragments	0.01
		Too acid	0.68			Slope	0.37
						Hard to reclaim (rock fragments)	0.95

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
PwC:							
Unaka, stony	40	Fair		Poor		Fair	
		Depth to bedrock	0.29	Depth to bedrock	0.00	Depth to bedrock	0.29
		Droughty	0.45			Slope	0.37
		Too acid	0.50			Rock fragments	0.41
		Organic matter content low	0.50			Too acid	0.88
PwD:							
Porters, stony	60	Fair		Fair		Poor	
		Organic matter content low	0.50	Slope	0.08	Slope	0.00
		Too acid	0.68	Depth to bedrock	0.87	Rock fragments	0.01
						Hard to reclaim (rock fragments)	0.95
Unaka, stony	30	Fair		Poor		Poor	
		Depth to bedrock	0.29	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.45	Slope	0.08	Depth to bedrock	0.29
		Too acid	0.50			Rock fragments	0.41
		Organic matter content low	0.50			Too acid	0.88
PwE:							
Porters, stony	50	Fair		Poor		Poor	
		Organic matter content low	0.50	Slope	0.00	Slope	0.00
		Too acid	0.68	Depth to bedrock	0.87	Rock fragments	0.01
						Hard to reclaim (rock fragments)	0.95
Unaka, stony	30	Fair		Poor		Poor	
		Depth to bedrock	0.29	Slope	0.00	Slope	0.00
		Droughty	0.45	Depth to bedrock	0.00	Depth to bedrock	0.29
		Organic matter content low	0.50			Rock fragments	0.41
		Too acid	0.50			Too acid	0.88
PxF:							
Porters, rocky	40	Fair		Poor		Poor	
		Organic matter content low	0.50	Slope	0.00	Slope	0.00
		Too acid	0.68	Depth to bedrock	0.87	Rock fragments	0.01
						Hard to reclaim (rock fragments)	0.95
Unaka, rocky	35	Fair		Poor		Poor	
		Depth to bedrock	0.29	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.45	Slope	0.00	Depth to bedrock	0.29
		Too acid	0.50			Rock fragments	0.41
		Organic matter content low	0.50			Too acid	0.88
RdA:							
Reddies, occasionally flooded	80	Fair		Fair		Poor	
		Organic matter content low	0.12	Wetness depth	0.98	Hard to reclaim (rock fragments)	0.00
		Too acid	0.88			Rock fragments	0.82
		Droughty	0.97			Wetness depth	0.98

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
RkF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Cleveland, very bouldery	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Organic matter content low	0.50			Rock fragments	0.68
		Too acid	0.54			Too acid	0.98
RoF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Oteen, very bouldery	30	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50			Too sandy	0.99
		Too sandy	0.99				
RsA:							
Rosman, occasionally flooded	80	Fair		Good		Good	
		Organic matter content low	0.50				
		Too acid	0.84				
SoD:							
Soco, stony	50	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.08	Too acid	0.50
		Depth to bedrock	0.90			Depth to bedrock	0.90
		Droughty	0.91				
Stecoah, stony	40	Fair		Fair		Poor	
		Too acid	0.50	Slope	0.08	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.16	Too acid	0.50
SoE:							
Soco, stony	65	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.00	Too acid	0.50
		Depth to bedrock	0.90			Depth to bedrock	0.90
		Droughty	0.91				
Stecoah, stony	25	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.58	Too acid	0.50

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
SoF:							
Soco, stony	45	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.00	Too acid	0.50
						Depth to bedrock	0.90
		Depth to bedrock	0.90				
		Droughty	0.91				
Stecoah, stony	35	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.16	Too acid	0.50
StB:							
Statler, rarely flooded	85	Fair		Poor		Fair	
		Organic matter content low	0.50	Low strength	0.00	Rock fragments	0.88
		Too acid	0.84				
SyD:							
Sylco, stony	55	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.05	Slope	0.08	Rock fragments	0.00
		Too acid	0.50			Depth to bedrock	0.05
		Organic matter content low	0.50			Too acid	0.59
Soco, stony	40	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.08	Too acid	0.50
						Rock fragments	0.83
		Droughty	0.84			Depth to bedrock	0.90
		Depth to bedrock	0.90				
SyE:							
Sylco, stony	55	Poor		Poor		Poor	
		Droughty	0.00	Slope	0.00	Slope	0.00
		Depth to bedrock	0.05	Depth to bedrock	0.00	Rock fragments	0.00
		Too acid	0.50			Depth to bedrock	0.05
		Organic matter content low	0.50			Too acid	0.59
Soco, stony	40	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.00	Too acid	0.50
						Rock fragments	0.83
		Droughty	0.84			Depth to bedrock	0.90
		Depth to bedrock	0.90				
SzF:							
Sylco, very stony	50	Poor		Poor		Poor	
		Droughty	0.00	Slope	0.00	Slope	0.00
		Depth to bedrock	0.05	Depth to bedrock	0.00	Rock fragments	0.00
		Too acid	0.50			Depth to bedrock	0.05
		Organic matter content low	0.50			Too acid	0.59

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
SzF:							
Soco, very stony----	35	Fair		Poor		Poor	
		Too acid	0.50	Depth to bedrock	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.00	Too acid	0.50
						Rock fragments	0.83
		Droughty	0.84			Depth to bedrock	0.90
		Depth to bedrock	0.90				
TaB:							
Tate----------------	85	Fair		Poor		Fair	
		Organic matter content low	0.50	Low strength	0.00	Hard to reclaim (rock fragments)	0.18
		Too acid	0.68			Rock fragments	0.99
TaC:							
Tate----------------	85	Fair		Poor		Fair	
		Organic matter content low	0.50	Low strength	0.00	Hard to reclaim (rock fragments)	0.18
		Too acid	0.68			Slope	0.37
						Rock fragments	0.99
TaD:							
Tate----------------	85	Fair		Poor		Poor	
		Organic matter content low	0.50	Low strength	0.00	Slope	0.00
				Slope	0.08	Hard to reclaim (rock fragments)	0.18
		Too acid	0.68				
						Rock fragments	0.99
TkC:							
Tate, very stony----	85	Fair		Good		Poor	
		Too acid	0.20			Rock fragments	0.00
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.18
						Slope	0.37
						Too acid	0.76
TkD:							
Tate, very stony----	85	Fair		Fair		Poor	
		Too acid	0.20	Slope	0.08	Rock fragments	0.00
		Organic matter content low	0.50			Slope	0.00
						Hard to reclaim (rock fragments)	0.18
						Too acid	0.76
TmB:							
Tate----------------	50	Fair		Fair		Fair	
		Organic matter content low	0.50	Low strength	0.78	Rock fragments	0.99
		Too acid	0.68				
Urban land----------	40	Not rated		Not rated		Not rated	
TmC:							
Tate----------------	50	Fair		Fair		Fair	
		Organic matter content low	0.50	Low strength	0.78	Slope	0.37
						Rock fragments	0.99
		Too acid	0.68				
Urban land----------	40	Not rated		Not rated		Not rated	

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
TmD:							
Tate	50	Fair		Fair		Poor	
		Organic matter content low	0.50	Slope	0.08	Slope	0.00
		Too acid	0.68	Low strength	0.78	Rock fragments	0.99
Urban land	40	Not rated		Not rated		Not rated	
TnE:							
Toecane, extremely bouldery	85	Poor		Poor		Poor	
		Cobble content	0.00	Slope	0.00	Slope	0.00
		Stone content	0.04	Cobble content	0.00	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12	Stone content	0.16	Rock fragments	0.00
		Too acid	0.50			Too acid	0.76
ToC:							
Toecane, bouldery	50	Fair		Poor		Poor	
		Organic matter content low	0.12	Cobble content	0.00	Hard to reclaim (rock fragments)	0.00
		Stone content	0.25	Stone content	0.84	Rock fragments	0.00
		Cobble content	0.28			Slope	0.37
		Too acid	0.50			Too acid	0.76
Tusquitee, bouldery	40	Fair		Good		Fair	
		Too acid	0.54			Slope	0.37
		Organic matter content low	0.88			Rock fragments	0.82
						Hard to reclaim (rock fragments)	0.98
						Too acid	0.98
TpD:							
Toecane, very bouldery	50	Fair		Poor		Poor	
		Organic matter content low	0.12	Cobble content	0.00	Slope	0.00
		Stone content	0.25	Slope	0.08	Hard to reclaim (rock fragments)	0.00
		Cobble content	0.28	Stone content	0.84	Rock fragments	0.00
		Too acid	0.50			Too acid	0.76
Tusquitee, very bouldery	40	Fair		Fair		Poor	
		Organic matter content low	0.50	Slope	0.08	Slope	0.00
		Too acid	0.54			Hard to reclaim (rock fragments)	0.74
						Rock fragments	0.82
						Too acid	0.98
TpE:							
Toecane, very bouldery	55	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Rock fragments	0.00
		Stone content	0.25	Cobble content	0.00	Slope	0.00
		Cobble content	0.28	Stone content	0.84	Hard to reclaim (rock fragments)	0.00
		Too acid	0.50			Too acid	0.76

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
TpE:							
Tusquitee, very bouldery	35	Fair		Poor		Poor	
		Organic matter content low	0.50	Slope	0.00	Slope	0.00
						Hard to reclaim (rock fragments)	0.74
		Too acid	0.54				
						Rock fragments	0.82
						Too acid	0.98
TsA:							
Toxaway, frequently flooded	80	Fair		Poor		Poor	
		Too acid	0.84	Wetness depth	0.00	Wetness depth	0.00
						Hard to reclaim (rock fragments)	0.92
TtE:							
Trimont, stony	85	Fair		Poor		Poor	
		Too acid	0.54	Slope	0.00	Slope	0.00
						Hard to reclaim (rock fragments)	0.95
						Too acid	0.98
TuD:							
Tusquitee, stony	65	Fair		Fair		Poor	
		Organic matter content low	0.50	Slope	0.08	Slope	0.00
						Hard to reclaim (rock fragments)	0.74
		Too acid	0.54				
						Rock fragments	0.82
						Too acid	0.98
Toecane, stony	25	Poor		Poor		Poor	
		Cobble content	0.00	Cobble content	0.00	Slope	0.00
		Stone content	0.09	Slope	0.08	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12	Stone content	0.36		
						Rock fragments	0.00
		Too acid	0.50			Too acid	0.76
TwB:							
Tusquitee	55	Fair		Good		Fair	
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.74
		Too acid	0.54			Rock fragments	0.82
						Too acid	0.98
Whiteside	35	Fair		Fair		Fair	
		Organic matter content low	0.12	Wetness depth	0.89	Rock fragments	0.82
						Wetness depth	0.89
		Too acid	0.54			Too acid	0.98

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
TwC:							
Tusquitee	55	Fair		Good		Fair	
		Organic matter content low	0.50			Slope	0.37
		Too acid	0.54			Hard to reclaim (rock fragments)	0.74
						Rock fragments	0.82
						Too acid	0.98
Whiteside	35	Fair		Fair		Fair	
		Organic matter content low	0.12	Wetness depth	0.89	Slope	0.37
		Too acid	0.54			Rock fragments	0.82
						Wetness depth	0.89
						Too acid	0.98
UcB:							
Udifluvents, frequently flooded	95	Poor		Good		Poor	
		Too sandy	0.00			Too sandy	0.00
		Organic matter content low	0.12			Rock fragments	0.99
Ud:							
Udorthents, loamy	85	Fair		Good		Good	
		Organic matter content low	0.12				
		Too acid	0.97				
UfB:							
Udorthents, occasionally flooded	60	Fair		Good		Good	
		Organic matter content low	0.12				
		Too acid	0.97				
Urban land, occasionally flooded	30	Not rated		Not rated		Not rated	
UhE:							
Udorthents, rocky	55	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
		Too acid	0.97	Low strength	0.78		
Urban land	40	Not rated		Not rated		Not rated	
UkD:							
Unaka, very bouldery	40	Fair		Poor		Poor	
		Depth to bedrock	0.29	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.45	Slope	0.08	Depth to bedrock	0.29
		Too acid	0.50			Rock fragments	0.41
		Organic matter content low	0.50			Too acid	0.88
Rock outcrop	35	Not rated		Not rated		Not rated	

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
UkE:							
Unaka, very bouldery	40	Fair		Poor		Poor	
		Depth to bedrock	0.29	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.45	Slope	0.00	Depth to bedrock	0.29
		Too acid	0.50			Rock fragments	0.41
		Organic matter content low	0.50			Too acid	0.88
Rock outcrop--------	35	Not rated		Not rated		Not rated	
UkF:							
Unaka, very bouldery	40	Fair		Poor		Poor	
		Depth to bedrock	0.29	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.45	Slope	0.00	Depth to bedrock	0.29
		Too acid	0.50			Rock fragments	0.41
		Organic matter content low	0.50			Too acid	0.88
Rock outcrop--------	35	Not rated		Not rated		Not rated	
UnB:							
Unison--------------	90	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.95	Hard to reclaim (rock fragments)	0.00
		Too acid	0.54			Too acid	0.98
						Rock fragments	0.99
UnC:							
Unison--------------	80	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.95	Hard to reclaim (rock fragments)	0.00
		Too acid	0.54			Slope	0.37
						Too acid	0.98
						Rock fragments	0.99
UnD:							
Unison--------------	80	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.08	Too clayey	0.00
				Shrink-swell	0.95	Hard to reclaim (rock fragments)	0.00
		Too acid	0.54			Too acid	0.98
						Rock fragments	0.99
UrB:							
Unison--------------	60	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.87	Too acid	0.98
						Rock fragments	0.99
		Too acid	0.54				
Urban land----------	30	Not rated		Not rated		Not rated	
UrC:							
Unison--------------	60	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Shrink-swell	0.87	Slope	0.37
						Too acid	0.98
		Too acid	0.54			Rock fragments	0.99

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
UrC:							
Urban land----------	30	Not rated		Not rated		Not rated	
Ux:							
Urban land----------	90	Not rated		Not rated		Not rated	
W:							
Water---------------	100	Not rated		Not rated		Not rated	
WaC2:							
Walnut, moderately eroded-------------	40	Fair		Poor		Fair	
		Droughty	0.03	Depth to bedrock	0.00	Depth to bedrock	0.26
		Depth to bedrock	0.26			Slope	0.37
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				
Oteen, moderately eroded-------------	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00			Slope	0.37
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50			Too sandy	0.99
		Too sandy	0.99				
Mars Hill, moderately eroded--	20	Fair		Fair		Fair	
		Too acid	0.50	Depth to bedrock	0.23	Slope	0.37
		Organic matter content low	0.50			Rock fragments	0.76
		Too sandy	0.99			Too sandy	0.99
WaD2:							
Walnut, moderately eroded-------------	40	Fair		Poor		Poor	
		Droughty	0.03	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.26	Slope	0.08	Depth to bedrock	0.26
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				
Oteen, moderately eroded-------------	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.08	Depth to bedrock	0.00
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50			Too sandy	0.99
		Too sandy	0.99				
Mars Hill, moderately eroded--	20	Fair		Fair		Poor	
		Too acid	0.50	Slope	0.08	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.23	Rock fragments	0.76
		Too sandy	0.99			Too sandy	0.99

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
WaE2:							
Walnut, moderately eroded	40	Fair		Poor		Poor	
		Droughty	0.03	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Depth to bedrock	0.26
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				
Oteen, moderately eroded	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50			Too sandy	0.99
		Too sandy	0.99				
Mars Hill, moderately eroded	20	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Slope	0.00
		Organic matter content low	0.50	Depth to bedrock	0.23	Rock fragments	0.76
						Too sandy	0.99
		Too sandy	0.99				
WnF:							
Walnut	45	Fair		Poor		Poor	
		Droughty	0.09	Slope	0.00	Slope	0.00
		Depth to bedrock	0.26	Depth to bedrock	0.00	Depth to bedrock	0.26
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50				
Oteen	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Slope	0.00
		Depth to bedrock	0.00	Slope	0.00	Depth to bedrock	0.00
		Too acid	0.50			Rock fragments	0.76
		Organic matter content low	0.50			Too sandy	0.99
		Too sandy	0.99				
Rock outcrop	20	Not rated		Not rated		Not rated	
WoE:							
Wayah, bouldery	50	Fair		Poor		Poor	
		Too acid	0.08	Slope	0.00	Slope	0.00
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.26
						Rock fragments	0.82
						Too acid	0.98
Burton, bouldery	40	Poor		Poor		Poor	
		Droughty	0.00	Slope	0.00	Slope	0.00
		Depth to bedrock	0.16	Depth to bedrock	0.00	Rock fragments	0.12
		Organic matter content low	0.50			Depth to bedrock	0.16
						Too acid	0.76
		Too acid	0.50				
		Stone content	0.97				

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
WpF:							
Wayah, very rocky---	50	Fair		Poor		Poor	
		Too acid	0.08	Slope	0.00	Slope	0.00
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.26
						Rock fragments	0.82
						Too acid	0.98
Burton, very rocky--	40	Poor		Poor		Poor	
		Droughty	0.00	Slope	0.00	Slope	0.00
		Depth to bedrock	0.16	Depth to bedrock	0.00	Rock fragments	0.12
		Too acid	0.50			Depth to bedrock	0.16
		Organic matter content low	0.50			Too acid	0.76
		Stone content	0.97				
WrC:							
Wayah, windswept----	50	Fair		Good		Fair	
		Too acid	0.08			Hard to reclaim (rock fragments)	0.26
		Organic matter content low	0.50			Slope	0.37
						Rock fragments	0.82
						Too acid	0.98
Burton, windswept---	40	Fair		Poor		Fair	
		Depth to bedrock	0.10	Depth to bedrock	0.00	Depth to bedrock	0.10
		Droughty	0.26			Slope	0.37
		Too acid	0.50			Too acid	0.76
WrD:							
Wayah, windswept----	50	Fair		Fair		Poor	
		Too acid	0.08	Slope	0.08	Slope	0.00
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.26
						Rock fragments	0.82
						Too acid	0.98
Burton, windswept---	40	Fair		Poor		Poor	
		Depth to bedrock	0.10	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.26	Slope	0.08	Depth to bedrock	0.10
		Too acid	0.50			Too acid	0.76
WrE:							
Wayah, windswept----	50	Fair		Poor		Poor	
		Too acid	0.08	Slope	0.00	Slope	0.00
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.26
						Rock fragments	0.82
						Too acid	0.98
Burton, windswept---	40	Fair		Poor		Poor	
		Depth to bedrock	0.10	Slope	0.00	Slope	0.00
		Droughty	0.26	Depth to bedrock	0.00	Depth to bedrock	0.10
		Too acid	0.50			Too acid	0.76

Table 13.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
WsF:							
Wayah, windswept----	60	Fair		Poor		Poor	
		Too acid	0.08	Slope	0.00	Slope	0.00
		Organic matter content low	0.50			Hard to reclaim (rock fragments)	0.26
						Rock fragments	0.82
						Too acid	0.98
Burton, windswept---	30	Fair		Poor		Poor	
		Depth to bedrock	0.16	Slope	0.00	Slope	0.00
		Droughty	0.27	Depth to bedrock	0.00	Depth to bedrock	0.16
		Too acid	0.50			Too acid	0.76
WtB:							
Whiteside-----------	90	Fair		Fair		Fair	
		Organic matter content low	0.50	Wetness depth	0.89	Rock fragments	0.82
						Wetness depth	0.89
		Too acid	0.54			Too acid	0.98
WtC:							
Whiteside-----------	90	Fair		Fair		Fair	
		Organic matter content low	0.50	Wetness depth	0.89	Slope	0.37
						Rock fragments	0.82
		Too acid	0.54			Wetness depth	0.89
						Too acid	0.98
ZcB:							
Zillicoa------------	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Depth to bedrock	0.39	Rock fragments	0.59
		Too acid	0.54				
ZcC:							
Zillicoa------------	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Organic matter content low	0.50	Depth to bedrock	0.39	Slope	0.37
						Rock fragments	0.59
		Too acid	0.54				
ZoD:							
Zillicoa, stony-----	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Slope	0.00
		Organic matter content low	0.50	Slope	0.08	Too clayey	0.00
				Depth to bedrock	0.39	Rock fragments	0.59
		Too acid	0.54				

Table 14.—Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
AcD:							
Ashe, very stony	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	1.00	Seepage	0.03		
		Depth to bedrock	0.86				
Cleveland, very stony	30	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Seepage	0.04		
Rock outcrop	20	Not rated		Not rated		Not rated	
ArE:							
Ashe, very bouldery	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	1.00	Seepage	0.03		
		Depth to bedrock	0.86				
Cleveland, very bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Seepage	0.04		
Rock outcrop	20	Not rated		Not rated		Not rated	
ArF:							
Ashe, very bouldery	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.86	Depth to water	1.00
		Slope	1.00	Seepage	0.03		
		Depth to bedrock	0.86				
Cleveland, very bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Seepage	0.04		
Rock outcrop	20	Not rated		Not rated		Not rated	
BaD:							
Balsam, extremely bouldery	60	Very limited		Very limited		Very limited	
		Seepage	1.00	Large stones content	1.00	Depth to water	1.00
		Slope	1.00	Seepage	0.03		
Tanasee, extremely bouldery	30	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.04	Depth to water	1.00
		Slope	1.00				

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
BaE:							
Balsam, extremely bouldery	60	Very limited		Very limited		Very limited	
		Seepage	1.00	Large stones content	1.00	Depth to water	1.00
		Slope	1.00	Seepage	0.03		
Tanasee, extremely bouldery	30	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.04	Depth to water	1.00
		Slope	1.00				
BeA:							
Biltmore, occasionally flooded	90	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.86	Cutbanks cave	1.00
						Depth to saturated zone	0.99
BkB2:							
Braddock, moderately eroded	80	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	0.32				
BkC2:							
Braddock, moderately eroded	80	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	1.00				
BkD2:							
Braddock, moderately eroded	85	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	1.00				
BnB:							
Braddock	40	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	0.68				
Urban land	30	Not rated		Not rated		Not rated	
BnC:							
Braddock	40	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	1.00				
Urban land	30	Not rated		Not rated		Not rated	
BpF:							
Breakneck, windswept	55	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.91		
		Depth to bedrock	0.91				
Pullback, windswept	30	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Piping	1.00		

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
BwD:							
Burton, windswept---	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.88	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.88				
Craggey, windswept--	40	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Seepage	0.02		
BxE:							
Burton, windswept---	45	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.88	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.88				
Craggey, windswept--	30	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Seepage	0.02		
Rock outcrop--------	20	Not rated		Not rated		Not rated	
BxF:							
Burton, windswept---	45	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.88	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.88				
Craggey, windswept--	30	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Seepage	0.02		
Rock outcrop--------	20	Not rated		Not rated		Not rated	
CaE:							
Cataska, very rocky-	45	Very limited		Not rated		Very limited	
		Slope	1.00			Depth to water	1.00
		Depth to bedrock	0.91				
		Seepage	0.43				
Sylco, very rocky---	40	Very limited		Not rated		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.86				
CdF:							
Cataska, very stony-	40	Very limited		Not rated		Very limited	
		Slope	1.00			Depth to water	1.00
		Depth to bedrock	0.91				
		Seepage	0.43				
Sylco, very stony---	30	Very limited		Not rated		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.99				
Rock outcrop--------	20	Not rated		Not rated		Not rated	

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ChD:							
Cheoah, stony-------	55	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.08		
		Depth to bedrock	0.01				
Jeffrey, stony------	30	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	0.99	Depth to water	1.00
		Slope	1.00	Thin layer	0.83		
		Depth to bedrock	0.83				
ChE:							
Cheoah, stony-------	55	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.08		
		Depth to bedrock	0.01				
Jeffrey, stony------	30	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	0.99	Depth to water	1.00
		Slope	1.00	Thin layer	0.83		
		Depth to bedrock	0.83				
ChF:							
Cheoah, stony-------	60	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.08		
		Depth to bedrock	0.01				
Jeffrey, stony------	30	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	0.99	Depth to water	1.00
		Slope	1.00	Thin layer	0.83		
		Depth to bedrock	0.83				
CkB2:							
Clifton, moderately eroded-------------	85	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	0.32				
CkC2:							
Clifton, moderately eroded-------------	85	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
CkD2:							
Clifton, moderately eroded-------------	80	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
CkE2:							
Clifton, moderately eroded-------------	85	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
CsB:							
Clifton, stony------	85	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	0.32				

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CsC:							
Clifton, stony------	85	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
CsD:							
Clifton, stony------	85	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
CuB:							
Clifton-------------	50	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	0.32				
Urban land----------	40	Not rated		Not rated		Not rated	
CuC:							
Clifton-------------	50	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
Urban land----------	40	Not rated		Not rated		Not rated	
CuD:							
Clifton-------------	50	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
Urban land----------	40	Not rated		Not rated		Not rated	
CxE:							
Craggey, windswept--	50	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Seepage	0.02		
Rock outcrop--------	20	Not rated		Not rated		Not rated	
Clingman, windswept-	25	Very limited		Not rated		Very limited	
		Slope	1.00			Depth to water	1.00
		Depth to bedrock	1.00				
CxF:							
Craggey, windswept--	50	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Seepage	0.02		
Rock outcrop--------	20	Not rated		Not rated		Not rated	
Clingman, windswept-	25	Very limited		Not rated		Very limited	
		Slope	1.00			Depth to water	1.00
		Depth to bedrock	1.00				
DAM:							
Dam-----------------	100	Not rated		Not rated		Not rated	

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
DeA:							
Dellwood, occasionally flooded	60	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.68	Cutbanks cave	1.00
				Depth to saturated zone	0.43	Depth to saturated zone	0.25
				Large stones content	0.02	Large stones content	0.02
Reddies, occasionally flooded	30	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.79	Cutbanks cave	1.00
				Depth to saturated zone	0.68	Depth to saturated zone	0.14
DrB:							
Dillard, rarely flooded	80	Very limited		Somewhat limited		Somewhat limited	
		Seepage	1.00	Depth to saturated zone	0.86	Cutbanks cave	0.10
				Piping	0.79	Depth to saturated zone	0.06
				Seepage	0.04		
EdC:							
Edneyville, stony	55	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.04	Depth to water	1.00
		Slope	1.00				
Chestnut, stony	25	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.66	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
		Depth to bedrock	0.03				
EdD:							
Edneyville, stony	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.04	Depth to water	1.00
		Slope	1.00				
Chestnut, stony	35	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.66	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
		Depth to bedrock	0.03				
EdE:							
Edneyville, stony	55	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.04	Depth to water	1.00
		Slope	1.00				
Chestnut, stony	25	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.66	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
		Depth to bedrock	0.03				
EdF:							
Edneyville, stony	45	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.04	Depth to water	1.00
		Slope	1.00				

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
EdF:							
Chestnut, stony-----	35	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.66	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
		Depth to bedrock	0.03				
EvD2:							
Evard, moderately eroded-------------	55	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.04	Depth to water	1.00
		Seepage	0.70				
Cowee, moderately eroded-------------	35	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.94	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.20				
EvE2:							
Evard, moderately eroded-------------	55	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.04	Depth to water	1.00
		Seepage	0.70				
Cowee, moderately eroded-------------	35	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.94	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.20				
EvF2:							
Evard, moderately eroded-------------	50	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.04	Depth to water	1.00
		Seepage	0.70				
Cowee, moderately eroded-------------	30	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.94	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.20				
EwC:							
Evard, stony--------	55	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.04	Depth to water	1.00
		Seepage	0.70				
Cowee, stony--------	25	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.56	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.02				
EwD:							
Evard, stony--------	55	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.04	Depth to water	1.00
		Seepage	0.70				
Cowee, stony--------	25	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.56	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.02				

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
EwE:							
Evard, stony	55	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.04	Depth to water	1.00
		Seepage	0.70				
Cowee, stony	25	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.56	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.02				
EwF:							
Evard, stony	55	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.04	Depth to water	1.00
		Seepage	0.70				
Cowee, stony	25	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.56	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.02				
ExC:							
Evard	40	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.04	Depth to water	1.00
		Seepage	0.70				
Cowee	25	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.94	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.20				
Urban land	20	Not rated		Not rated		Not rated	
ExD:							
Evard	40	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.04	Depth to water	1.00
		Seepage	0.70				
Cowee	25	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.94	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.20				
Urban land	20	Not rated		Not rated		Not rated	
ExE:							
Evard	40	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.04	Depth to water	1.00
		Seepage	0.70				
Cowee	30	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.94	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.20				
Urban land	20	Not rated		Not rated		Not rated	
FaC2:							
Fannin, moderately eroded	55	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.91	Depth to water	1.00
		Seepage	0.70	Seepage	0.03		

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
FaC2:							
Lauada, moderately eroded	25	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.74	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.05				
FaD2:							
Fannin, moderately eroded	55	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.91	Depth to water	1.00
		Seepage	0.70	Seepage	0.03		
Lauada, moderately eroded	25	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.74	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.05				
FaE2:							
Fannin, moderately eroded	55	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.91	Depth to water	1.00
		Seepage	0.70	Seepage	0.03		
Lauada, moderately eroded	25	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.74	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.05				
FnB:							
Fannin, moderately eroded	40	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.91	Depth to water	1.00
		Slope	0.32	Seepage	0.03		
Lauada, moderately eroded	25	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Thin layer	0.74	Depth to water	1.00
		Slope	0.32				
		Depth to bedrock	0.05				
Urban land	20	Not rated		Not rated		Not rated	
FnC:							
Fannin, moderately eroded	40	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.91	Depth to water	1.00
		Seepage	0.70	Seepage	0.03		
Lauada, moderately eroded	25	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.74	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.05				
Urban land	20	Not rated		Not rated		Not rated	

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
FnD:							
Fannin, moderately eroded	40	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.91	Depth to water	1.00
		Seepage	0.70	Seepage	0.03		
Lauada, moderately eroded	25	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.74	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.05				
Urban land	20	Not rated		Not rated		Not rated	
FrA:							
French, occasionally flooded	90	Very limited		Very limited		Very limited	
		Seepage	1.00	Depth to saturated zone	1.00	Cutbanks cave	1.00
				Seepage	0.79		
HcE:							
Heintooga, very stony	55	Very limited		Very limited		Very limited	
		Seepage	1.00	Large stones content	1.00	Depth to water	1.00
		Slope	1.00				
Chiltoskie, very stony	35	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.04	Depth to water	1.00
		Slope	1.00				
HpA:							
Hemphill, rarely flooded	75	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.03	Depth to saturated zone	1.00	Slow refill	0.30
						Cutbanks cave	0.10
				Piping	0.01		
IoA:							
Iotla, occasionally flooded	85	Very limited		Very limited		Very limited	
		Seepage	1.00	Depth to saturated zone	1.00	Cutbanks cave	1.00
				Piping	1.00		
JbB:							
Junaluska	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.66	Depth to water	1.00
		Slope	0.32	Seepage	0.01		
		Depth to bedrock	0.03				

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
JbB:							
Brasstown-----------	40	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.55	Depth to water	1.00
		Slope	0.32	Thin layer	0.26		
		Depth to bedrock	0.01				
JbC:							
Junaluska-----------	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.66	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
		Depth to bedrock	0.03				
Brasstown-----------	40	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.55	Depth to water	1.00
		Seepage	0.70	Thin layer	0.26		
		Depth to bedrock	0.01				
JbD:							
Junaluska-----------	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.95	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.23				
Brasstown-----------	40	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.55	Depth to water	1.00
		Seepage	0.70	Thin layer	0.26		
		Depth to bedrock	0.01				
JbE:							
Junaluska-----------	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.95	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.23				
Brasstown-----------	40	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Piping	0.55	Depth to water	1.00
		Seepage	0.70	Thin layer	0.26		
		Depth to bedrock	0.01				
KsB:							
Kanuga--------------	50	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.32	Depth to saturated zone	0.86	Cutbanks cave	1.00
		Seepage	0.03			Slow refill	0.97
						Depth to saturated zone	0.06
Swannanoa-----------	35	Somewhat limited		Very limited		Very limited	
		Slope	0.32	Depth to saturated zone	1.00	Cutbanks cave	1.00
		Seepage	0.03			Slow refill	0.97
				Hard to pack	0.51		
KsC:							
Kanuga--------------	50	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Depth to saturated zone	0.86	Cutbanks cave	1.00
		Seepage	0.03			Slow refill	0.97
						Depth to saturated zone	0.06

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
KsC:							
Swannanoa-----------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to saturated zone	1.00	Cutbanks cave	1.00
		Seepage	0.03	Hard to pack	0.51	Slow refill	0.97
MvD:							
Mars Hill, stony----	55	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.22	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.01				
Walnut, stony-------	35	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.94	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.20				
MvE:							
Mars Hill, stony----	55	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.22	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.01				
Walnut, stony-------	35	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.94	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.20				
MvF:							
Mars Hill, stony----	55	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.22	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.01				
Walnut, stony-------	35	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.94	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.20				
MwD:							
Micaville, stony----	45	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.08	Depth to water	1.00
		Slope	1.00	Seepage	0.05		
		Depth to bedrock	0.01				
Brownwood, stony----	35	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.93	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.19				
MwE:							
Micaville, stony----	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.08	Depth to water	1.00
		Slope	1.00	Seepage	0.05		
		Depth to bedrock	0.01				
Brownwood, stony----	30	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.93	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.19				

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MwF:							
Micaville, stony----	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.08	Depth to water	1.00
		Slope	1.00	Seepage	0.05		
		Depth to bedrock	0.01				
Brownwood, stony----	35	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.93	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.19				
NkA:							
Nikwasi, frequently flooded------------	70	Very limited		Very limited		Very limited	
		Seepage	1.00	Ponding	1.00	Cutbanks cave	1.00
				Depth to saturated zone	1.00		
				Seepage	0.51		
NtD:							
Northcove, very stony--------------	60	Very limited		Very limited		Very limited	
		Seepage	1.00	Large stones content	1.00	Depth to water	1.00
		Slope	1.00				
				Seepage	0.03		
Maymead, very stony-	30	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
NtE:							
Northcove, very stony--------------	45	Very limited		Very limited		Very limited	
		Seepage	1.00	Large stones content	1.00	Depth to water	1.00
		Slope	1.00				
				Seepage	0.03		
Maymead, very stony-	35	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
OwC:							
Oconaluftee, windswept----------	45	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
Guyot, windswept----	25	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.03	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
		Depth to bedrock	0.01				

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
OwC:							
Cataloochee, windswept----------	20	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.83	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
		Depth to bedrock	0.09				
OwD:							
Oconaluftee, windswept----------	45	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
Guyot, windswept----	25	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.03	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
		Depth to bedrock	0.01				
Cataloochee, windswept----------	20	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.83	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
		Depth to bedrock	0.09				
OwE:							
Oconaluftee, windswept----------	35	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
Guyot, windswept----	30	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.03	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
		Depth to bedrock	0.01				
Cataloochee, windswept----------	25	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.83	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
		Depth to bedrock	0.09				
OwF:							
Oconaluftee, windswept----------	40	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
Guyot, windswept----	35	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.03	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
		Depth to bedrock	0.01				
Cataloochee, windswept----------	25	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.83	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
		Depth to bedrock	0.09				
Pg:							
Pits, gravel--------	100	Not rated		Not rated		Not rated	

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
Pt:							
Pits, quarry	90	Not rated		Not rated		Not rated	
PwC:							
Porters, stony	45	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.03	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.03				
Unaka, stony	40	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.93		
		Depth to bedrock	0.83				
PwD:							
Porters, stony	60	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.03	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.03				
Unaka, stony	30	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.93		
		Depth to bedrock	0.83				
PwE:							
Porters, stony	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.03	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.03				
Unaka, stony	30	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.93		
		Depth to bedrock	0.83				
PxF:							
Porters, rocky	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.03	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.03				
Unaka, rocky	35	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.93		
		Depth to bedrock	0.83				
RdA:							
Reddies, occasionally flooded	80	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.79	Cutbanks cave	1.00
				Depth to saturated zone	0.68	Depth to saturated zone	0.14

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
RkF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Cleveland, very bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Seepage	0.04		
RoF:							
Rock outcrop	60	Not rated		Not rated		Not rated	
Oteen, very bouldery	30	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	0.66	Seepage	0.04		
		Seepage	0.43				
RsA:							
Rosman, occasionally flooded	80	Very limited		Not limited		Somewhat limited	
		Seepage	1.00			Depth to saturated zone	0.90
						Cutbanks cave	0.10
SoD:							
Soco, stony	50	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.70		
		Depth to bedrock	0.04				
Stecoah, stony	40	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.26		
		Depth to bedrock	0.01				
SoE:							
Soco, stony	65	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.70		
		Depth to bedrock	0.04				
Stecoah, stony	25	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.11		
		Depth to bedrock	0.01				
SoF:							
Soco, stony	45	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.70		
		Depth to bedrock	0.04				
Stecoah, stony	35	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.26		
		Depth to bedrock	0.01				

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
StB:							
Statler, rarely flooded	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.05	Depth to water	1.00
						Slow refill	0.30
SyD:							
Sylco, stony	55	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.99	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.99				
Soco, stony	40	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.70		
		Depth to bedrock	0.04				
SyE:							
Sylco, stony	55	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.99	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.99				
Soco, stony	40	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.70		
		Depth to bedrock	0.04				
SzF:							
Sylco, very stony	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.99	Depth to water	1.00
		Slope	1.00				
		Depth to bedrock	0.99				
Soco, very stony	35	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.70		
		Depth to bedrock	0.04				
TaB:							
Tate	85	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Piping	0.55	Depth to water	1.00
		Slope	0.32				
TaC:							
Tate	85	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Piping	0.55	Depth to water	1.00
		Slope	1.00				
TaD:							
Tate	85	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Piping	0.55	Depth to water	1.00
		Slope	1.00				
TkC:							
Tate, very stony	85	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
TkD:							
Tate, very stony----	85	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
TmB:							
Tate----------------	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Piping	0.63	Depth to water	1.00
		Slope	0.32	Seepage	0.01		
Urban land----------	40	Not rated		Not rated		Not rated	
TmC:							
Tate----------------	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Piping	0.63	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
Urban land----------	40	Not rated		Not rated		Not rated	
TmD:							
Tate----------------	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Piping	0.63	Depth to water	1.00
		Slope	1.00	Seepage	0.01		
Urban land----------	40	Not rated		Not rated		Not rated	
TnE:							
Toecane, extremely bouldery-----------	85	Very limited		Very limited		Very limited	
		Seepage	1.00	Large stones content	1.00	Depth to water	1.00
		Slope	1.00	Seepage	0.11		
ToC:							
Toecane, bouldery---	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Large stones content	0.83	Depth to water	1.00
		Slope	1.00	Seepage	0.11		
Tusquitee, bouldery-	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.01	Depth to water	1.00
		Slope	1.00				
TpD:							
Toecane, very bouldery-----------	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Large stones content	0.83	Depth to water	1.00
		Slope	1.00	Seepage	0.11		
Tusquitee, very bouldery-----------	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.02	Depth to water	1.00
		Slope	1.00				
TpE:							
Toecane, very bouldery-----------	55	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Large stones content	0.83	Depth to water	1.00
		Slope	1.00	Seepage	0.11		

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
TpE:							
Tusquitee, very bouldery	35	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.02	Depth to water	1.00
		Slope	1.00				
TsA:							
Toxaway, frequently flooded	80	Very limited		Very limited		Very limited	
		Seepage	1.00	Depth to saturated zone	1.00	Cutbanks cave	1.00
				Seepage	0.04		
TtE:							
Trimont, stony	85	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Seepage	0.01	Depth to water	1.00
		Seepage	0.70				
TuD:							
Tusquitee, stony	65	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.02	Depth to water	1.00
		Slope	1.00				
Toecane, stony	25	Very limited		Very limited		Very limited	
		Seepage	1.00	Large stones content	1.00	Depth to water	1.00
		Slope	1.00				
				Seepage	0.11		
TwB:							
Tusquitee	55	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.02	Depth to water	1.00
		Slope	0.32				
Whiteside	35	Very limited		Somewhat limited		Somewhat limited	
		Seepage	1.00	Depth to saturated zone	0.86	Cutbanks cave	0.10
		Slope	0.32			Depth to saturated zone	0.06
				Seepage	0.01		
TwC:							
Tusquitee	55	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.02	Depth to water	1.00
		Slope	1.00				
Whiteside	35	Very limited		Somewhat limited		Somewhat limited	
		Slope	1.00	Depth to saturated zone	0.86	Cutbanks cave	0.10
		Seepage	1.00			Depth to saturated zone	0.06
				Seepage	0.01		
UcB:							
Udifluvents, frequently flooded	95	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.86	Cutbanks cave	1.00
						Depth to saturated zone	0.90

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ud:							
Udorthents, loamy---	85	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Seepage	0.05				
UfB:							
Udorthents, occasionally flooded------------	60	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.03	Depth to water	1.00
Urban land, occasionally flooded------------	30	Not rated		Not rated		Not rated	
UhE:							
Udorthents, rocky---	55	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.03	Depth to water	1.00
		Slope	1.00				
Urban land----------	40	Not rated		Not rated		Not rated	
UkD:							
Unaka, very bouldery	40	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.93		
		Depth to bedrock	0.83				
Rock outcrop--------	35	Not rated		Not rated		Not rated	
UkE:							
Unaka, very bouldery	40	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.93		
		Depth to bedrock	0.83				
Rock outcrop--------	35	Not rated		Not rated		Not rated	
UkF:							
Unaka, very bouldery	40	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
		Slope	1.00	Thin layer	0.93		
		Depth to bedrock	0.83				
Rock outcrop--------	35	Not rated		Not rated		Not rated	
UnB:							
Unison--------------	90	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	0.32				
UnC:							
Unison--------------	80	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				
UnD:							
Unison--------------	80	Very limited		Not limited		Very limited	
		Seepage	1.00			Depth to water	1.00
		Slope	1.00				

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
UrB:							
Unison	60	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Hard to pack	0.77	Depth to water	1.00
		Slope	0.32				
Urban land	30	Not rated		Not rated		Not rated	
UrC:							
Unison	60	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Hard to pack	0.77	Depth to water	1.00
		Seepage	0.70				
Urban land	30	Not rated		Not rated		Not rated	
Ux:							
Urban land	90	Not rated		Not rated		Not rated	
W:							
Water	100	Not limited		Not rated		Not rated	
WaC2:							
Walnut, moderately eroded	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.94	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.20				
Oteen, moderately eroded	35	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	0.66	Seepage	0.04		
		Seepage	0.43				
Mars Hill, moderately eroded	20	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.22	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.01				
WaD2:							
Walnut, moderately eroded	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.94	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.20				
Oteen, moderately eroded	35	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	0.66	Seepage	0.04		
		Seepage	0.43				
Mars Hill, moderately eroded	20	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.22	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.01				

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
WaE2:							
Walnut, moderately eroded	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.94	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.20				
Oteen, moderately eroded	35	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	0.66	Seepage	0.04		
		Seepage	0.43				
Mars Hill, moderately eroded	20	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.22	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.01				
WnF:							
Walnut	45	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.94	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.20				
Oteen	35	Very limited		Very limited		Very limited	
		Slope	1.00	Thin layer	1.00	Depth to water	1.00
		Depth to bedrock	0.66	Seepage	0.04		
		Seepage	0.43				
Rock outcrop	20	Not rated		Not rated		Not rated	
WoE:							
Wayah, bouldery	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.04	Depth to water	1.00
		Slope	1.00				
Burton, bouldery	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.96	Depth to water	1.00
		Slope	1.00	Seepage	0.04		
		Depth to bedrock	0.96				
WpF:							
Wayah, very rocky	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.04	Depth to water	1.00
		Slope	1.00				
Burton, very rocky	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.96	Depth to water	1.00
		Slope	1.00	Seepage	0.04		
		Depth to bedrock	0.96				
WrC:							
Wayah, windswept	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.04	Depth to water	1.00
		Slope	1.00				
Burton, windswept	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.98	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.93				

Table 14.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
WrD:							
Wayah, windswept----	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.04	Depth to water	1.00
		Slope	1.00				
Burton, windswept---	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.98	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.93				
WrE:							
Wayah, windswept----	50	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.04	Depth to water	1.00
		Slope	1.00				
Burton, windswept---	40	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.98	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.93				
WsF:							
Wayah, windswept----	60	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.04	Depth to water	1.00
		Slope	1.00				
Burton, windswept---	30	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Thin layer	0.96	Depth to water	1.00
		Slope	1.00	Seepage	0.02		
		Depth to bedrock	0.96				
WtB:							
Whiteside-----------	90	Very limited		Somewhat limited		Somewhat limited	
		Seepage	1.00	Depth to saturated zone	0.86	Cutbanks cave	0.10
		Slope	0.32			Depth to saturated zone	0.06
WtC:							
Whiteside-----------	90	Very limited		Somewhat limited		Somewhat limited	
		Seepage	1.00	Depth to saturated zone	0.86	Cutbanks cave	0.10
		Slope	1.00			Depth to saturated zone	0.06
ZcB:							
Zillicoa------------	85	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Thin layer	0.16	Depth to water	1.00
		Slope	0.32				
		Depth to bedrock	0.01				
ZcC:							
Zillicoa------------	85	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.16	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.01				
ZoD:							
Zillicoa, stony-----	85	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.16	Depth to water	1.00
		Seepage	0.70				
		Depth to bedrock	0.01				

Table 15.—Engineering Index Properties

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass[ing] sieve number--		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
AcD:									
Ashe, very stony	0-5	Sandy loam	SC-SM, SM	A-4	0-1	0-5	90-100	77-100	54-83
	5-25	Loam, sandy loam, fine sandy loam	SC-SM, SM	A-4	0-1	0-5	87-100	69-100	61-10[0]
	25-30	Gravelly sandy loam, cobbly sandy loam, sandy loam	SM	A-4, A-2-4	0-1	0-11	80-97	56-97	41-80
	30-80	Unweathered bedrock			---	---	---	---	---
Cleveland, very stony----------	0-5	Sandy loam	SM, SC-SM	A-4, A-2-4	0	0-5	82-100	63-100	44-84
	5-14	Sandy loam	SM, SC-SM	A-4, A-2-4	0	0-5	82-100	63-100	44-84
	14-80	Unweathered bedrock			---	---	---	---	---
Rock outcrop----	0-80	Bedrock			---	---	---	---	---
ArE:									
Ashe, very bouldery-------	0-5	Sandy loam	SC-SM, SM	A-4	0-1	0-5	90-100	77-100	54-83
	5-25	Loam, sandy loam, fine sandy loam	SC-SM, SM	A-4	0-1	0-5	87-100	69-100	61-10[0]
	25-30	Gravelly sandy loam, cobbly sandy loam, sandy loam	SM	A-2-4, A-4	0-1	0-11	80-97	56-97	41-80
	30-80	Unweathered bedrock			---	---	---	---	---
Cleveland, very bouldery-------	0-5	Sandy loam	SM, SC-SM	A-2-4, A-4	0	0-5	82-100	63-100	44-84
	5-14	Sandy loam	SM, SC-SM	A-2-4, A-4	0	0-5	82-100	63-100	44-84
	14-80	Unweathered bedrock			---	---	---	---	---
Rock outcrop----	0-80	Bedrock			---	---	---	---	---
ArF:									
Ashe, very bouldery-------	0-5	Sandy loam	SC-SM, SM	A-4	0-1	0-5	90-100	77-100	54-83
	5-25	Loam, sandy loam, fine sandy loam	SC-SM, SM	A-4	0-1	0-5	87-100	69-100	61-10[0]
	25-30	Gravelly sandy loam, cobbly sandy loam, sandy loam	SM	A-2-4, A-4	0-1	0-11	80-97	56-97	41-80
	30-80	Unweathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
ArF:									
Cleveland, very bouldery-------	0-5	Sandy loam	SM, SC-SM	A-2-4, A-4	0	0-5	82-100	63-100	44-84
	5-14	Sandy loam	SM, SC-SM	A-2-4, A-4	0	0-5	82-100	63-100	44-84
	14-80	Unweathered bedrock			---	---	---	---	---
Rock outcrop----	0-80	Bedrock			---	---	---	---	---
BaD:									
Balsam, extremely bouldery-------	0-11	Cobbly loam	SM	A-1-b, A-2-5, A-5	0-21	25-48	69-93	41-93	33-87
	11-20	Very cobbly sandy loam, very stony sandy loam, very cobbly loam, very cobbly fine sandy loam	GW-GC, SC	A-2-6, A-2-4	13-43	27-45	53-97	16-97	14-97
	20-42	Very cobbly fine sandy loam, very stony loam, very stony fine sandy loam, very cobbly loam	GP-GC, SC	A-6, A-2-4	13-43	27-45	53-97	16-97	13-91
	42-80	Very cobbly sandy loam, very stony coarse sandy loam, very stony loam	GM, GP-GM, SM, SP-SM	A-1-b, A-2-4, A-3	12-41	25-42	54-98	18-98	12-81
Tanasee, extremely bouldery-------	0-15	Loam	MH, ML, SM	A-7-5, A-5	0-2	0-6	89-100	68-100	55-94
	15-28	Sandy loam, gravelly sandy loam, loam	SC-SM, SC	A-1-b, A-2-4, A-4, A-6	0	0-11	77-100	54-100	37-84
	28-80	Gravelly sandy loam, sandy loam, loam	SW-SM, SC-SM, SC	A-1-b, A-2-4, A-4, A-6	0-5	0-16	74-100	40-100	27-84

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
BaE:									
Balsam, extremely bouldery-------	0-11	Cobbly loam	SM	A-1-b, A-2-5, A-5	0-21	25-48	69-93	41-93	33-87
	11-20	Very cobbly sandy loam, very stony sandy loam, very cobbly loam, very cobbly fine sandy loam	GW-GC, SC	A-2-6, A-2-4	13-43	27-45	53-97	16-97	14-97
	20-42	Very cobbly fine sandy loam, very stony loam, very stony fine sandy loam, very cobbly loam	GP-GC, SC	A-6, A-2-4	13-43	27-45	53-97	16-97	13-91
	42-80	Very cobbly sandy loam, very stony coarse sandy loam, very stony loam	GM, GP-GM, SM, SP-SM	A-1-b, A-2-4, A-3	12-41	25-42	54-98	18-98	12-81
Tanasee, extremely bouldery-------	0-15	Loam	MH, ML, SM	A-7-5, A-5	0-2	0-6	89-100	68-100	55-94
	15-28	Sandy loam, gravelly sandy loam, loam	SC-SM, SC	A-1-b, A-2-4, A-4, A-6	0	0-11	77-100	54-100	37-84
	28-80	Gravelly sandy loam, sandy loam, loam	SW-SM, SC-SM, SC	A-1-b, A-2-4, A-4, A-6	0-5	0-16	74-100	40-100	27-84
BeA:									
Biltmore, occasionally flooded--------	0-8	Loamy sand	SM	A-2-4	0	0-5	94-100	83-100	63-83
	8-80	Loamy sand, sand, fine sand	SP-SM, SP	A-3	0	0-7	95-100	80-100	60-79
BkB2:									
Braddock, moderately eroded---------	0-11	Clay loam	CL, SC	A-6, A-7-6	0	0-5	80-100	61-100	52-98
	11-57	Clay, clay loam, sandy clay, gravelly clay	SC, CH, CL, GC	A-7-6	0	0-12	86-100	65-100	55-10
	57-80	Loam, gravelly sandy clay loam, sandy clay loam	CL, SC	A-6, A-7-6	0	0-12	86-100	65-100	55-10

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
BkC2: Braddock, moderately eroded---------	0-11	Clay loam	CL, SC	A-6, A-7-6	0	0-5	80-100	61-100	52-98
	11-57	Clay, clay loam, sandy clay, gravelly clay	SC, CH, CL, GC	A-7-6	0	0-12	86-100	65-100	55-10
	57-80	Loam, gravelly sandy clay loam, sandy clay loam	CL, SC	A-6, A-7-6	0	0-12	86-100	65-100	55-10
BkD2: Braddock, moderately eroded---------	0-11	Clay loam	CL, SC	A-6, A-7-6	0	0-5	80-100	61-100	52-98
	11-57	Clay, clay loam, sandy clay, gravelly clay	SC, CH, CL, GC	A-7-6	0	0-12	86-100	65-100	55-10
	57-80	Loam, gravelly sandy clay loam, sandy clay loam	CL, SC	A-6, A-7-6	0	0-12	86-100	65-100	55-10
BnB: Braddock--------	0-9	Clay loam	CL	A-6, A-7-6	0	0-5	80-100	61-100	52-98
	9-48	Clay, clay loam, sandy clay, gravelly clay	SC, CH, CL, GC	A-7-6	0	0-12	86-100	65-100	55-10
	48-80	Loam, gravelly sandy clay loam, sandy clay loam	CL, SC	A-6, A-7-6	0	0-12	86-100	65-100	55-10
Urban land.									
BnC: Braddock--------	0-11	Clay loam	CL	A-6, A-7-6	0	0-5	80-100	61-100	52-98
	11-57	Clay, clay loam, sandy clay, gravelly clay	SC, CH, CL, GC	A-7-6	0	0-12	86-100	65-100	55-10
	57-80	Loam, gravelly sandy clay loam, sandy clay loam	CL, SC	A-6, A-7-6	0	0-12	86-100	65-100	55-10
Urban land.									

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
BpF:									
Breakneck, windswept------	0-12	Clay loam, loam, channery loam, channery clay loam	CL-ML, CL	A-6, A-4	0	0-30	58-100	57-100	42-96
	12-28	Channery sandy loam, sandy loam, channery loam, loam	CL, CL-ML	A-4, A-6	0	0-24	69-100	68-100	53-96
	28-80	Unweathered bedrock			---	---	---	---	---
Pullback, windswept------	0-8	Clay loam, loam, channery loam, channery clay loam	CL, CL-ML	A-6, A-4	0	0-30	58-100	57-100	45-96
	8-16	Channery sandy loam, sandy loam, loam, channery loam	CL, CL-ML	A-4, A-6	0	0-24	69-100	68-100	51-96
	16-80	Unweathered bedrock			---	---	---	---	---
BwD:									
Burton, windswept------	0-17	Sandy clay loam	SM	A-2-4, A-4, A-5	0-8	0-10	81-100	63-100	45-85
	17-29	Sandy loam, loam, gravelly sandy loam	SC-SM, SM	A-4, A-2-4	0	0-16	76-100	53-100	38-85
	29-80	Unweathered bedrock			---	---	---	---	---
Craggey, windswept------	0-14	Sandy loam	SM, SC-SM	A-5, A-4, A-2-4	0-3	0-5	84-96	64-96	47-83
	14-80	Unweathered bedrock			---	---	---	---	---
BxE:									
Burton, windswept------	0-17	Sandy clay loam	SM	A-2-4, A-4, A-5	0-8	0-10	81-100	63-100	45-85
	17-29	Sandy loam, loam, gravelly sandy loam	SC-SM, SM	A-4, A-2-4	0	0-16	76-100	53-100	38-85
	29-80	Unweathered bedrock			---	---	---	---	---
Craggey, windswept------	0-14	Sandy loam	SC-SM, SM	A-2-4, A-4, A-5	0-3	0-5	84-96	64-96	47-83
	14-80	Unweathered bedrock			---	---	---	---	---
Rock outcrop----	0-80	Bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
BxF:									
Burton, windswept------	0-17	Sandy clay loam	SM	A-2-4, A-4, A-5	0-8	0-10	81-100	63-100	45-85
	17-29	Sandy loam, loam, gravelly sandy loam	SC-SM, SM	A-4, A-2-4	0	0-16	76-100	53-100	38-85
	29-80	Unweathered bedrock			---	---	---	---	---
Craggey, windswept------	0-14	Sandy loam	SC-SM, SM	A-2-4, A-4, A-5	0-3	0-5	84-96	64-96	47-83
	14-80	Unweathered bedrock			---	---	---	---	---
Rock outcrop----	0-80	Bedrock			---	---	---	---	---
CaE:									
Cataska, very rocky----------	0-6	Very channery loam	SM	A-4	40-60	7-35	---	---	---
	6-16	Channery silt loam, channery loam, very channery silt loam	GC-GM, GM	A-1-b, A-2-4	6-13	22-49	---	---	---
	16-28	Weathered bedrock			---	---	---	---	---
	28-80	Unweathered bedrock			---	---	---	---	---
Sylco, very rocky----------	0-6	Very channery loam	GC, GC-GM, GM	A-2-4, A-4	0-7	13-41	---	---	---
	6-30	Very channery silt loam, channery silty clay loam, extremely channery silt loam	GC, GC-GM	A-4, A-6	9-16	29-50	---	---	---
	30-80	Unweathered bedrock			---	---	---	---	---
CdF:									
Cataska, very stony----------	0-4	Channery silt loam	ML	A-2-4, A-4	0-3	12-24	---	---	---
	4-12	Channery silt loam, channery loam, very channery silt loam	GC-GM, GM	A-1-b, A-2-4	6-13	22-49	---	---	---
	12-28	Weathered bedrock			---	---	---	---	---
	28-80	Unweathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
CdF:									
Sylco, very stony----------	0-5	Channery loam, very channery loam	GC, GC-GM, GM	A-2-4, A-4	0-8	15-37	---	---	---
	5-23	Very channery loam, channery silty clay loam, extremely channery silt loam	GC, GC-GM	A-4, A-6	9-16	29-50	---	---	---
	23-80	Unweathered bedrock			---	---	---	---	---
Rock outcrop----	0-80	Bedrock			---	---	---	---	---
ChD:									
Cheoah, stony---	0-12	Loam	ML	A-4, A-5, A-7-5	0	0	100	100	80-95
	12-38	Loam, fine sandy loam, silt loam	CL-ML, ML	A-4	0	0	100	100	81-94
	38-51	Channery loam, channery fine sandy loam, channery silt loam	CL-ML, ML	A-4	0	0	100	100	77-97
	51-80	Weathered bedrock			---	---	---	---	---
Jeffrey, stony--	0-8	Loam	ML	A-4, A-5, A-7-5	0	0	100	100	80-95
	8-31	Channery loam, channery fine sandy loam, channery silt loam	CL-ML, ML	A-4	0	0	100	100	77-97
	31-80	Unweathered bedrock			---	---	---	---	---
ChE:									
Cheoah, stony---	0-12	Loam	ML	A-4, A-5, A-7-5	0	0	100	100	80-95
	12-38	Loam, fine sandy loam, silt loam	CL-ML, ML	A-4	0	0	100	100	81-94
	38-51	Channery loam, channery fine sandy loam, channery silt loam	CL-ML, ML	A-4	0	0	100	100	77-97
	51-80	Weathered bedrock			---	---	---	---	---
Jeffrey, stony--	0-8	Loam	ML	A-4, A-5, A-7-5	0	0	100	100	80-95
	8-31	Channery loam, channery fine sandy loam, channery silt loam	CL-ML, ML	A-4	0	0	100	100	77-97
	31-80	Unweathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
ChF:									
Cheoah, stony---	0-12	Loam	ML	A-4, A-5, A-7-5	0	0	100	100	80-95
	12-38	Loam, fine sandy loam, silt loam	CL-ML, ML	A-4	0	0	100	100	81-94
	38-51	Channery loam, channery fine sandy loam, channery silt loam	CL-ML, ML	A-4	0	0	100	100	77-97
	51-80	Weathered bedrock			---	---	---	---	---
Jeffrey, stony--	0-8	Loam	ML	A-4, A-5, A-7-5	0	0	100	100	80-95
	8-31	Channery loam, channery fine sandy loam, channery silt loam	CL-ML, ML	A-4	0	0	100	100	77-97
	31-80	Unweathered bedrock			---	---	---	---	---
CkB2: Clifton, moderately eroded---------	0-8	Clay loam	CL	A-7-6, A-6	0	0-5	89-100	78-100	66-98
	8-55	Clay, clay loam	CH, CL	A-7-6	0	0-5	95-100	81-100	68-10
	55-80	Fine sandy loam, loam	CL, ML, SC, SM	A-4, A-6	0-6	0-13	88-100	72-100	51-92
CkC2: Clifton, moderately eroded---------	0-8	Clay loam	CL	A-7-6, A-6	0	0-5	89-100	78-100	66-98
	8-55	Clay, clay loam	CH, CL	A-7-6	0	0-5	95-100	81-100	68-10
	55-80	Fine sandy loam, loam	CL, ML, SC, SM	A-4, A-6	0-6	0-13	88-100	72-100	51-92
CkD2: Clifton, moderately eroded---------	0-8	Clay loam	CL	A-7-6, A-6	0	0-5	89-100	78-100	66-98
	8-55	Clay, clay loam	CH, CL	A-7-6	0	0-5	95-100	81-100	68-10
	55-80	Fine sandy loam, loam	CL, ML, SC, SM	A-4, A-6	0-6	0-13	88-100	72-100	51-92
CkE2: Clifton, moderately eroded---------	0-8	Clay loam	CL	A-7-6, A-6	0	0-5	89-100	78-100	66-98
	8-55	Clay, clay loam	CH, CL	A-7-6	0	0-5	95-100	81-100	68-10
	55-80	Fine sandy loam, loam	CL, ML, SC, SM	A-4, A-6	0-6	0-13	88-100	72-100	51-92

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage pass sieve number-: 4	10	40
	In				Pct	Pct			
CsB:									
Clifton, stony--	0-8	Sandy loam, loam	SC, SC-SM	A-4	0	0-5	95-100	77-100	61-97
	8-55	Clay, clay loam	CH, CL	A-7-6	0	0-5	95-100	81-100	68-10
	55-80	Fine sandy loam, loam	CL, ML, SC, SM	A-4, A-6	0-6	0-15	88-100	72-100	51-92
CsC:									
Clifton, stony--	0-8	Sandy loam, loam	SC, SC-SM	A-4	0	0-5	95-100	77-100	61-97
	8-55	Clay, clay loam	CH, CL	A-7-6	0	0-5	95-100	81-100	68-10
	55-80	Fine sandy loam, loam	CL, ML, SC, SM	A-4, A-6	0-6	0-15	88-100	72-100	51-92
CsD:									
Clifton, stony--	0-8	Sandy loam, loam	SC, SC-SM	A-4	0	0-5	95-100	77-100	61-97
	8-55	Clay, clay loam	CH, CL	A-7-6	0	0-5	95-100	81-100	68-10
	55-80	Fine sandy loam, loam	CL, ML, SC, SM	A-4, A-6	0-6	0-15	88-100	72-100	51-92
CuB:									
Clifton---------	0-8	Clay loam	CL	A-6, A-7-6	0	0-5	89-100	78-100	66-98
	8-55	Clay, clay loam	CH, CL	A-7-6	0	0-5	95-100	81-100	68-10
	55-80	Fine sandy loam, loam	CL, ML, SC, SM	A-4, A-6	0-6	0-13	88-100	72-100	51-92
Urban land.									
CuC:									
Clifton---------	0-8	Clay loam	CL	A-6, A-7-6	0	0-5	89-100	78-100	66-98
	8-55	Clay, clay loam	CH, CL	A-7-6	0	0-5	95-100	81-100	68-10
	55-80	Fine sandy loam, loam	CL, ML, SC, SM	A-4, A-6	0-6	0-13	88-100	72-100	51-92
Urban land.									
CuD:									
Clifton---------	0-8	Clay loam	CL	A-6, A-7-6	0	0-5	89-100	78-100	66-98
	8-55	Clay, clay loam	CH, CL	A-7-6	0	0-5	95-100	81-100	68-10
	55-80	Fine sandy loam, loam	CL, ML, SC, SM	A-4, A-6	0-6	0-13	88-100	72-100	51-92
Urban land.									
CxE:									
Craggey, windswept------	0-14	Sandy loam	SC-SM, SM	A-2-4, A-4, A-5	0-3	0-5	84-96	64-96	47-83
	14-80	Unweathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
CxE:									
Rock outcrop----	0-80	Bedrock			---	---	---	---	---
Clingman, windswept------	0-14	Peat, mucky peat	PT	A-8	---	---	---	---	---
	14-18	Loamy sand, sandy loam, loam	SC-SM, SM	A-1-b, A-2-4	0	0-4	87-100	67-100	50-88
	18-80	Unweathered bedrock			---	---	---	---	---
CxF:									
Craggey, windswept------	0-14	Sandy loam	SC-SM, SM	A-2-4, A-4, A-5	0-3	0-5	84-96	64-96	47-83
	14-80	Unweathered bedrock			---	---	---	---	---
Rock outcrop----	0-80	Bedrock			---	---	---	---	---
Clingman, windswept------	0-14	Peat, mucky peat	PT	A-8	0-3	0-5	---	---	---
	14-18	Loamy sand, sandy loam, loam	SC-SM, SM	A-1-b, A-2-4	0	0-4	87-100	67-100	50-88
	18-80	Unweathered bedrock			---	---	---	---	---
DAM. Dam									
DeA:									
Dellwood, occasionally flooded--------	0-8	Gravelly fine sandy loam	SM	A-1-b, A-2-4, A-4	0-1	0-14	73-88	51-88	44-84
	8-16	Extremely gravelly sand, very gravelly sand, very gravelly loamy sand	GP-GM, GW-GM, GP	A-1-a	0-5	10-23	47-83	7-83	5-67
	16-80	Extremely gravelly sand, very cobbly sand, extremely gravelly coarse sand	GP, GP-GM, GW-GM	A-1-a	0-5	25-40	47-89	7-77	3-35

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number—: 4	10	40
	In				Pct	Pct			
DeA: Reddies, occasionally flooded--------	0-14	Loam, fine sandy loam, sandy loam	ML, SM	A-4	0	0-5	90-100	71-100	58-94
	14-26	Fine sandy loam, sandy loam, gravelly sandy loam	SM	A-1-b, A-2-4, A-4	0-1	0-13	75-100	41-100	35-98
	26-80	Extremely gravelly sand, very gravelly sand, very cobbly sand	GP, GP-GM, SP-SM	A-1-a, A-1-b	0-5	10-40	47-89	7-89	5-70
DrB: Dillard, rarely flooded--------	0-7	Loam	CL, ML	A-4	0	0-1	95-100	84-100	67-96
	7-50	Clay loam, sandy clay loam, loam	CL	A-6, A-7-6	0	0-1	95-100	82-100	67-99
	50-80	Sandy loam	SM	A-2-4	0	0	100	100	69-82
EdC: Edneyville, stony----------	0-5	Fine sandy loam	ML, SC-SM, SM	A-2-4, A-4, A-5	0-3	0-5	84-96	64-96	55-95
	5-43	Fine sandy loam, sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-3	0-5	87-100	68-100	59-10
	43-80	Sandy loam, gravelly sandy loam, fine sandy loam	SC-SM, SM	A-2-4, A-4	0-5	0-12	89-100	71-100	49-84
Chestnut, stony-	0-10	Gravelly fine sandy loam	SC-SM, SM	A-2-4, A-4, A-5	0-5	5-13	79-96	53-96	45-96
	10-36	Gravelly fine sandy loam, gravelly loam, sandy loam, cobbly fine sandy loam	SC-SM, SM	A-2-4, A-4	0-5	0-23	77-98	45-98	36-98
	36-80	Weathered bedrock			---	---	---	---	---
EdD: Edneyville, stony----------	0-5	Fine sandy loam	ML, SC-SM, SM	A-2-4, A-4, A-5	0-3	0-5	84-96	64-96	55-95
	5-43	Fine sandy loam, sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-3	0-5	87-100	68-100	59-10
	43-80	Sandy loam, gravelly sandy loam, fine sandy loam	SC-SM, SM	A-2-4, A-4	0-5	0-12	89-100	71-100	49-84

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
EdD:									
Chestnut, stony-	0-4	Gravelly fine sandy loam	SC-SM, SM	A-2-4, A-4, A-5	0-5	5-13	79-96	53-96	45-96
	4-36	Gravelly fine sandy loam, gravelly loam, sandy loam, cobbly fine sandy loam	SC-SM, SM	A-2-4, A-4	0-5	0-23	77-98	45-98	36-98
	36-80	Weathered bedrock			---	---	---	---	---
EdE:									
Edneyville, stony----------	0-5	Fine sandy loam	SC-SM, SM	A-2-4, A-4, A-5	0-3	0-5	84-96	64-96	54-94
	5-43	Fine sandy loam, sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-3	0-5	87-100	68-100	59-99
	43-80	Sandy loam, gravelly sandy loam, fine sandy loam	SC-SM, SM	A-2-4, A-4	0-5	0-12	89-100	71-100	49-84
Chestnut, stony-	0-4	Gravelly fine sandy loam	SC-SM, SM	A-2-4, A-4, A-5	0-5	5-14	79-96	52-96	45-96
	4-36	Gravelly fine sandy loam, gravelly loam, sandy loam, cobbly fine sandy loam	SC-SM, SM	A-2-4, A-4	0-5	0-23	76-98	45-98	37-98
	36-80	Weathered bedrock			---	---	---	---	---
EdF:									
Edneyville, stony----------	0-5	Fine sandy loam	SC-SM, SM	A-2-4, A-4, A-5	0-3	0-5	84-96	64-96	54-94
	5-43	Fine sandy loam, sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-3	0-5	87-100	68-100	59-99
	43-80	Sandy loam, gravelly sandy loam, fine sandy loam	SC-SM, SM	A-2-4, A-4	0-5	0-12	89-100	71-100	49-84
Chestnut, stony-	0-4	Gravelly fine sandy loam	SC-SM, SM	A-2-4, A-4, A-5	0-5	5-14	79-96	52-96	45-96
	4-36	Gravelly fine sandy loam, gravelly loam, sandy loam, cobbly fine sandy loam	SC-SM, SM	A-2-4, A-4	0-5	0-23	76-98	45-98	37-98
	36-80	Weathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
EvD2:									
Evard, moderately eroded---------	0-5	Clay loam	CL	A-6, A-7-6	0	0-1	90-100	75-100	65-96
	5-29	Sandy clay loam, clay loam, loam	CL, SC	A-2-6, A-6, A-7-6	0	0-1	90-100	76-100	60-95
	29-37	Sandy loam, loam, sandy clay loam	SC-SM	A-2-4, A-4	0	0-5	82-100	59-100	43-81
	37-80	Sandy loam, loam, loamy sand	SC-SM	A-2-4, A-4	0	0-15	77-100	49-100	34-84
Cowee, moderately eroded---------	0-5	Clay loam	CL	A-6, A-7-6	0	0-1	90-100	75-100	65-96
	5-27	Gravelly sandy clay loam, gravelly sandy loam, clay loam	SC	A-2-6, A-6, A-7-6	0-1	0-13	71-92	37-76	29-72
	27-80	Weathered bedrock			---	---	---	---	---
EvE2:									
Evard, moderately eroded---------	0-5	Clay loam	CL	A-6, A-7-6	0	0-1	90-100	75-100	65-96
	5-29	Sandy clay loam, clay loam, loam	CL, SC	A-2-6, A-6, A-7-6	0	0-1	90-100	76-100	60-95
	29-37	Sandy loam, loam, sandy clay loam	SC-SM	A-2-4, A-4	0	0-5	82-100	59-100	43-81
	37-80	Sandy loam, loam, loamy sand	SC-SM	A-2-4, A-4	0	0-15	77-100	49-100	34-84
Cowee, moderately eroded---------	0-5	Clay loam	CL	A-6, A-7-6	0	0-1	90-100	75-100	65-96
	5-27	Gravelly sandy clay loam, gravelly sandy loam, clay loam	SC	A-2-6, A-6, A-7-6	0-1	0-13	71-92	37-76	29-72
	27-80	Weathered bedrock			---	---	---	---	---
EvF2:									
Evard, moderately eroded---------	0-5	Clay loam	CL, ML	A-6, A-7-6	0	0-1	90-100	75-100	65-96
	5-29	Sandy clay loam, clay loam, loam	CL, SC	A-2-6, A-6, A-7-6	0	0-1	90-100	76-100	60-95
	29-37	Sandy loam, loam, sandy clay loam	SC-SM	A-2-4, A-4	0	0-5	82-100	59-100	43-81
	37-80	Sandy loam, loam, loamy sand	SC-SM	A-2-4, A-4	0	0-15	77-100	49-100	34-84

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
EvF2:									
Cowee, moderately eroded---------	0-5	Clay loam	CL, ML	A-6, A-7-6	0	0-1	90-100	75-100	65-96
	5-27	Gravelly sandy clay loam, gravelly sandy loam, clay loam	SC	A-2-6, A-6, A-7-6	0-1	0-13	71-92	37-76	29-72
	27-80	Weathered bedrock			---	---	---	---	---
EwC:									
Evard, stony----	0-5	Loam, fine sandy loam	ML, SM	A-2-4, A-4	0	0-5	83-100	64-100	54-10
	5-32	Clay loam, sandy clay loam	CL, SC	A-2-6, A-6, A-7-6	0	0-1	90-100	76-100	60-95
	32-45	Loam, fine sandy loam, sandy clay loam	CL, SC	A-2-4, A-4	0	0-5	81-100	61-100	52-10
	45-80	Sandy loam, loam, loamy sand	SC-SM, SM	A-4, A-2-4	0	0-15	82-100	64-100	44-84
Cowee, stony----	0-10	Sandy loam	SC-SM, SM	A-2-4, A-4, A-5, A-2-6	0-1	0-5	90-100	76-100	54-83
	10-38	Clay loam, gravelly sandy loam, gravelly sandy clay loam	CL, SC	A-2-6, A-6, A-7-6	0-1	0-13	86-98	69-98	53-92
	38-80	Weathered bedrock			---	---	---	---	---
EwD:									
Evard, stony----	0-5	Loam, fine sandy loam	ML, SM	A-2-4, A-4	0	0-5	83-100	75-100	54-10
	5-32	Clay loam, sandy clay loam	CL, SC	A-2-6, A-6, A-7-6	0	0-1	90-100	76-100	60-95
	32-45	Loam, fine sandy loam, sandy clay loam	CL, SC	A-2-6, A-4	0	0-5	81-100	61-100	52-10
	45-80	Sandy loam, loam, loamy sand	SC-SM, SM	A-4, A-2-4	0	0-15	82-100	64-100	44-84
Cowee, stony----	0-5	Sandy loam	SC-SM, SM	A-2-4, A-4, A-5, A-2-5	0-1	0-5	90-100	76-100	54-83
	5-38	Clay loam, gravelly sandy loam, gravelly sandy clay loam	CL, SC	A-2-6, A-6, A-7-6	0-1	0-13	86-98	69-98	53-92
	38-80	Weathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage pass sieve number-: 4	10	40
	In				Pct	Pct			
EwE:									
Evard, stony----	0-5	Loam, fine sandy loam	ML, SM	A-2-4, A-4	0-3	0-5	82-100	62-100	50-96
	5-32	Clay loam, sandy clay loam	CL, SC	A-6, A-7-6	0	0-1	89-100	75-100	60-94
	32-45	Loam, fine sandy loam, sandy clay loam	CL, SC	A-2-4, A-4	0	0-6	81-100	60-100	49-95
	45-80	Sandy loam, loam, loamy sand	SC-SM, SM	A-4, A-2-4	0	0-15	81-100	63-100	43-84
Cowee, stony----	0-5	Sandy loam	SC-SM, SM	A-2-4, A-4, A-5, A-2-5	0-1	0-5	90-100	76-100	54-83
	5-38	Clay loam, gravelly sandy loam, gravelly sandy clay loam	CL, SC	A-2-6, A-6, A-7-6	0-1	0-13	86-98	69-98	53-92
	38-80	Weathered bedrock			---	---	---	---	---
EwF:									
Evard, stony----	0-5	Loam, fine sandy loam	ML, SM	A-2-4, A-4	0	0-5	83-100	75-100	54-10
	5-32	Clay loam, sandy clay loam	CL, SC	A-2-6, A-6, A-7-6	0	0-1	90-100	76-100	60-95
	32-45	Loam, fine sandy loam, sandy clay loam	CL, SC	A-2-6, A-4	0	0-5	81-100	61-100	52-10
	45-80	Sandy loam, loam, loamy sand	SC-SM, SM	A-4, A-2-4	0	0-15	82-100	64-100	44-84
Cowee, stony----	0-5	Sandy loam	ML, SC-SM, SM	A-2-4, A-4, A-5, A-2-5	0-2	0-5	90-100	85-100	60-85
	5-38	Clay loam, gravelly sandy loam, gravelly sandy clay loam	CL, SC, SM, ML	A-2-4, A-4, A-6, A-7-6	0-2	0-15	47-99	45-90	32-85
	38-80	Weathered bedrock			---	---	---	---	---
ExC:									
Evard-----------	0-5	Clay loam	CL	A-6, A-7-6	0	0-1	90-100	75-100	65-96
	5-29	Sandy clay loam, clay loam, loam	CL, SC	A-2-6, A-6, A-7-6	0	0-1	90-100	76-100	60-95
	29-37	Sandy loam, loam, sandy clay loam	SC-SM	A-2-4, A-4	0	0-5	82-100	59-100	43-81
	37-80	Sandy loam, loam, loamy sand	SC-SM	A-2-4, A-4	0	0-15	77-100	49-100	34-84
Cowee-----------	0-5	Clay loam	CL, ML	A-6, A-7-6	0	0-1	90-100	75-100	65-96
	5-27	Gravelly sandy clay loam, gravelly sandy loam, clay loam	SC	A-2-6, A-6, A-7-6	0-1	0-13	71-92	37-76	29-72
	27-80	Weathered bedrock			---	---	---	---	---
Urban land.									

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
ExD:									
Evard-----------	0-5	Clay loam	CL	A-6, A-7-6	0	0-1	90-100	75-100	65-96
	5-29	Sandy clay loam, clay loam, loam	CL, SC	A-2-6, A-6, A-7-6	0	0-1	90-100	76-100	60-95
	29-37	Sandy loam, loam, sandy clay loam	SC-SM	A-2-4, A-4	0	0-5	82-100	59-100	43-81
	37-80	Sandy loam, loam, loamy sand	SC-SM	A-2-4, A-4	0	0-15	77-100	49-100	34-84
Cowee-----------	0-5	Clay loam	CL, ML	A-6, A-7-6	0	0-1	90-100	75-100	65-96
	5-27	Gravelly sandy clay loam, gravelly sandy loam, clay loam	SC	A-2-6, A-6, A-7-6	0-1	0-13	71-92	37-76	29-72
	27-80	Weathered bedrock			---	---	---	---	---
Urban land.									
ExE:									
Evard-----------	0-5	Clay loam	CL	A-6, A-7-6	0	0-1	90-100	75-100	65-96
	5-29	Sandy clay loam, clay loam, loam	CL, SC	A-2-6, A-6, A-7-6	0	0-1	90-100	76-100	60-95
	29-37	Sandy loam, loam, sandy clay loam	SC-SM	A-2-4, A-4	0	0-5	82-100	59-100	43-81
	37-80	Sandy loam, loam, loamy sand	SC-SM	A-2-4, A-4	0	0-15	77-100	49-100	34-84
Cowee-----------	0-5	Clay loam	CL, ML	A-6, A-7-6	0	0-1	90-100	75-100	65-96
	5-27	Gravelly sandy clay loam, gravelly sandy loam, clay loam	SC	A-2-6, A-6, A-7-6	0-1	0-13	71-92	37-76	29-72
	27-80	Weathered bedrock			---	---	---	---	---
Urban land.									
FaC2:									
Fannin, moderately eroded---------	0-7	Clay loam, sandy clay loam	SC, CL	A-6, A-7-6	0-1	0-10	89-100	73-100	57-95
	7-21	Sandy clay loam, clay loam, loam	CL	A-6, A-7-6	0	1-11	94-100	83-100	69-10
	21-80	Sandy loam, loam, fine sandy loam	ML, SM	A-2-4, A-4	0	0-5	78-100	52-100	44-10

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
FaC2:									
Lauada, moderately eroded---------	0-8	Clay loam, sandy clay loam	SC, CL	A-6, A-7-6	0-1	0-10	89-100	73-100	57-95
	8-34	Fine sandy loam, clay loam, loam, sandy clay loam	CL	A-6, A-7-6	0	0	74-100	73-100	57-95
	34-80	Bedrock			---	---	---	---	---
FaD2:									
Fannin, moderately eroded---------	0-7	Clay loam, sandy clay loam	SC, CL	A-6, A-7-6	0-1	0-10	89-100	73-100	57-95
	7-21	Sandy clay loam, clay loam, loam	CL	A-6, A-7-6	0	1-11	94-100	83-100	69-10
	21-80	Sandy loam, loam, fine sandy loam	ML, SM	A-2-4, A-4	0	0-5	78-100	52-100	44-10
Lauada, moderately eroded---------	0-8	Clay loam, sandy clay loam	SC, CL	A-6, A-7-6	0-1	0-10	89-100	73-100	57-95
	8-34	Fine sandy loam, clay loam, loam, sandy clay loam	CL	A-6, A-7-6	0	0	74-100	73-100	57-95
	34-80	Bedrock			---	---	---	---	---
FaE2:									
Fannin, moderately eroded---------	0-7	Clay loam, sandy clay loam	SC, CL	A-6, A-7-6	0-1	0-10	89-100	73-100	57-95
	7-21	Sandy clay loam, clay loam, loam	CL	A-6, A-7-6	0	1-11	94-100	83-100	69-10
	21-80	Sandy loam, loam, fine sandy loam	ML, SM	A-2-4, A-4	0	0-5	78-100	52-100	44-10
Lauada, moderately eroded---------	0-8	Clay loam, sandy clay loam	SC, CL	A-6, A-7-6	0-1	0-10	89-100	73-100	57-95
	8-34	Fine sandy loam, clay loam, loam, sandy clay loam	CL	A-6, A-7-6	0	0	74-100	73-100	57-95
	34-80	Bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
FnB:									
Fannin, moderately eroded---------	0-7	Clay loam, sandy clay loam	SC, CL	A-6, A-7-6	0-1	0-10	89-100	73-100	57-95
	7-21	Sandy clay loam, clay loam, loam	CL	A-6, A-7-6	0	1-11	94-100	83-100	69-10
	21-80	Sandy loam, loam, fine sandy loam	ML, SM	A-2-4, A-4	0	0-5	78-100	52-100	44-10
Lauada, moderately eroded---------	0-8	Clay loam, sandy clay loam	SC, CL	A-6, A-7-6	0-1	0-10	89-100	73-100	57-95
	8-34	Fine sandy loam, clay loam, loam, sandy clay loam	CL	A-6, A-7-6	0	0	74-100	73-100	57-95
	34-80	Bedrock			---	---	---	---	---
Urban land.									
FnC:									
Fannin, moderately eroded---------	0-7	Clay loam, sandy clay loam	SC, CL	A-6, A-7-6	0-1	0-10	89-100	73-100	57-95
	7-21	Sandy clay loam, clay loam, loam	CL	A-6, A-7-6	0	1-11	94-100	83-100	69-10
	21-80	Sandy loam, loam, fine sandy loam	ML, SM	A-2-4, A-4	0	0-5	78-100	52-100	44-10
Lauada, moderately eroded---------	0-8	Clay loam, sandy clay loam	SC, CL	A-6, A-7-6	0-1	0-10	89-100	73-100	57-95
	8-34	Fine sandy loam, clay loam, loam, sandy clay loam	CL	A-6, A-7-6	0	0	74-100	73-100	57-95
	34-80	Bedrock			---	---	---	---	---
Urban land.									

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
FnD:									
Fannin, moderately eroded---------	0-7	Clay loam, sandy clay loam	SC, CL	A-6, A-7-6	0-1	0-10	89-100	73-100	57-95
	7-21	Sandy clay loam, clay loam, loam	CL	A-6, A-7-6	0	1-11	94-100	83-100	69-10
	21-80	Sandy loam, loam, fine sandy loam	ML, SM	A-2-4, A-4	0	0-5	78-100	52-100	44-10
Lauada, moderately eroded---------	0-8	Clay loam, sandy clay loam	SC, CL	A-6, A-7-6	0-1	0-10	89-100	73-100	57-95
	8-34	Fine sandy loam, clay loam, loam, sandy clay loam	CL	A-6, A-7-6	0	0	74-100	73-100	57-95
	34-80	Bedrock			---	---	---	---	---
Urban land.									
FrA:									
French, occasionally flooded--------	0-12	Loam	CL, SC, SC-SM	A-4, A-6	0-1	0-13	95-100	84-100	66-98
	12-30	Loam, fine sandy loam, sandy clay loam	CL, SC, SC-SM	A-4, A-6, A-7-6	0	0-14	89-100	75-100	52-96
	30-80	Extremely gravelly sand, very gravelly loamy sand, very cobbly sand	GM, GP-GM, SM, SP-SM	A-1-a	0-5	10-40	58-89	8-89	7-74
HcE:									
Heintooga, very stony----------	0-12	Very flaggy loam	GC-GM, OH, OL	A-2-7	21-34	40-56	44-66	43-65	34-65
	12-25	Extremely channery fine sandy loam	GM, GC-GM	A-2-4, A-1-a	5-19	38-57	14-47	12-46	11-46
	25-80	Extremely flaggy coarse sandy loam	SM, SC-SM	A-1-b, A-2-4	23-63	35-59	19-73	18-72	11-51
Chiltoskie, very stony----------	0-8	Loam	SC-SM, OL, OH	A-7-5	0	0-9	90-100	89-100	76-98
	8-43	Loam	CL	A-4, A-6	0	0-12	86-100	86-100	72-98
	43-80	Very channery sandy loam	SM, SC-SM	A-2-4, A-1-b	0	25-35	40-70	30-50	25-45

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
HpA:									
Hemphill, rarely flooded--------	0-8	Loam	ML, SM	A-4	0	0	94-100	87-100	68-98
	8-32	Clay loam, silty clay, clay	CH, CL	A-7-6	0	0	94-100	89-100	75-10
	32-80	Sandy clay loam, loam, clay loam	SC, SC-SM, CL-ML	A-4, A-5, A-6, A-7-6	0	0	95-100	84-100	61-10
IoA:									
Iotla, occasionally flooded--------	0-10	Loam, sandy loam	SC, SC-SM, SM	A-4	0	0-5	95-100	72-100	61-91
	10-31	Fine sandy loam, loam, sandy loam	SC, SC-SM	A-4	0	0-5	95-100	72-100	60-94
	31-35	Loamy sand, sand	SM, SC-SM	A-2-4	0	0-4	95-100	82-100	63-84
	35-80	Fine sandy loam, loam, sandy loam	SC, SC-SM	A-4	0	0-5	95-100	72-100	61-91
JbB:									
Junaluska-------	0-5	Channery fine sandy loam	SM	A-2-4, A-4, A-5, A-7-6	0-9	8-29	70-91	69-91	59-89
	5-21	Sandy clay loam, channery clay loam, channery loam	CL, SC	A-6, A-7-6	0-4	0-15	87-100	87-100	68-95
	21-36	Flaggy fine sandy loam, channery fine sandy loam, channery loam	SC	A-4, A-6	4-13	12-25	79-91	79-91	72-87
	36-80	Weathered bedrock			---	---	---	---	---
Brasstown-------	0-6	Loam	ML, SM	A-4, A-5, A-7-6	0-5	0-17	84-100	84-100	68-94
	6-36	Loam, clay loam, channery clay loam, channery loam	CL	A-6, A-7-6	0-4	0-15	87-100	87-100	71-99
	36-45	Loam, channery very fine sandy loam, channery fine sandy loam	CL	A-4	0-4	0-14	87-100	87-100	66-88
	45-80	Weathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
JbC:									
Junaluska-------	0-5	Channery fine sandy loam	SM	A-2-4, A-4, A-5, A-7-6	0-9	8-29	70-91	69-91	59-89
	5-21	Sandy clay loam, channery clay loam, channery loam	CL, SC	A-6, A-7-6	0-4	0-15	87-100	87-100	68-95
	21-36	Flaggy fine sandy loam, channery fine sandy loam, channery loam	SC	A-4, A-6	4-13	12-25	79-91	79-91	72-87
	36-80	Weathered bedrock			---	---	---	---	---
Brasstown-------	0-6	Loam	ML, SM	A-4, A-6	0-5	0-17	84-100	84-100	68-94
	6-36	Loam, clay loam, channery clay loam, channery loam	CL	A-6, A-7-6	0-4	0-15	87-100	87-100	71-99
	36-45	Loam, channery very fine sandy loam, channery fine sandy loam	CL	A-4	0-4	0-14	87-100	87-100	66-88
	45-80	Weathered bedrock			---	---	---	---	---
JbD:									
Junaluska-------	0-2	Fine sandy loam, loam, silt loam	SC-SM	A-4, A-6	0-4	1-10	91-98	91-98	77-96
	2-11	Fine sandy loam, loam, silt loam	SC-SM	A-4, A-6	0-4	1-10	91-98	91-98	77-96
	11-21	Sandy clay loam, channery clay loam, channery loam	CL	A-6, A-7-6	0-4	0-15	87-100	87-100	68-95
	21-26	Fine sandy loam, loam, silt loam	SC-SM	A-4, A-6	0-4	1-10	91-98	91-98	77-96
	26-80	Weathered bedrock			---	---	---	---	---
Brasstown-------	0-6	Loam	ML, SM	A-4, A-5	0-5	0-17	84-100	84-100	68-94
	6-36	Loam, clay loam, channery clay loam, channery loam	CL	A-6, A-7-6	0-4	0-15	87-100	87-100	71-99
	36-45	Loam, channery very fine sandy loam, channery fine sandy loam	CL	A-4	0-4	0-14	87-100	87-100	71-94
	45-80	Weathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
JbE:									
Junaluska-------	0-2	Fine sandy loam, loam, silt loam	SC-SM	A-4, A-6	0-4	1-10	91-98	91-98	77-96
	2-11	Fine sandy loam, loam, silt loam	SC-SM	A-4, A-6	0-4	1-10	91-98	91-98	77-96
	11-21	Sandy clay loam, channery clay loam, channery loam	CL	A-6, A-7-6	0-4	0-15	87-100	87-100	68-95
	21-26	Fine sandy loam, loam, silt loam	SC-SM	A-4, A-6	0-4	1-10	91-98	91-98	77-96
	26-80	Weathered bedrock			---	---	---	---	---
Brasstown-------	0-6	Loam	ML, SM	A-5, A-4	0-5	0-17	84-100	84-100	68-94
	6-36	Loam, clay loam, channery clay loam, channery loam	CL	A-6, A-7-6	0-4	0-15	87-100	87-100	71-99
	36-45	Loam, channery very fine sandy loam, channery fine sandy loam	CL	A-4	0-4	0-14	87-100	87-100	71-94
	45-80	Weathered bedrock			---	---	---	---	---
KsB:									
Kanuga----------	0-12	Loam	CL-ML, ML	A-4	0	0-1	95-100	84-100	67-96
	12-58	Clay	CH, CL, SC	A-7-6	0	0-1	95-100	81-100	61-10
	58-91	Gravelly sandy clay loam, very gravelly sandy clay loam	CL, SC	A-6	0	0-23	56-77	33-73	28-73
Swannanoa-------	0-15	Silty clay loam, clay loam	ML, CL	A-7-5, A-7-6	0-2	0-2	89-100	78-100	74-10
	15-64	Clay	CH, CL, SC	A-7-6	0	0-1	95-100	81-100	61-10
	64-91	Gravelly clay, clay loam	CL	A-6, A-7-6	0	0-16	56-92	41-88	34-88
KsC:									
Kanuga----------	0-12	Loam	CL-ML, ML	A-4	0	0-1	95-100	84-100	67-96
	12-58	Clay	CH, CL, SC	A-7-6	0	0-1	95-100	81-100	61-10
	58-91	Gravelly sandy clay loam, very gravelly sandy clay loam	CL, SC	A-6	0	0-23	56-77	33-73	28-73
Swannanoa-------	0-15	Silty clay loam, clay loam	ML, CL	A-7-5, A-7-6	0-2	0-2	89-100	78-100	74-10
	15-64	Clay	CH, CL, SC	A-7-6	0	0-1	95-100	81-100	61-10
	64-91	Gravelly clay, clay loam	CL	A-6, A-7-6	0	0-16	56-92	41-88	34-88

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
MvD:									
Mars Hill, stony	0-3	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	3-9	Fine sandy loam, loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	9-35	Fine sandy loam, loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	57-97
	35-46	Fine sandy loam, sandy loam, gravelly sandy loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-10
	46-80	Weathered bedrock			---	---	---	---	---
Walnut, stony---	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	2-9	Fine sandy loam, loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	9-21	Loam, fine sandy loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-10
	27-80	Weathered bedrock			---	---	---	---	---
MvE:									
Mars Hill, stony	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	2-9	Fine sandy loam, loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	9-35	Fine sandy loam, loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	57-97
	35-46	Fine sandy loam, sandy loam, gravelly sandy loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-10
	46-80	Weathered bedrock			---	---	---	---	---
Walnut, stony---	0-3	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	3-9	Fine sandy loam, loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	9-21	Loam, fine sandy loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-10
	27-80	Weathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
MvF:									
Mars Hill, stony	0-3	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	3-9	Fine sandy loam, loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	9-35	Fine sandy loam, loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	57-97
	35-46	Fine sandy loam, sandy loam, gravelly sandy loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-10
	46-80	Weathered bedrock			---	---	---	---	---
Walnut, stony---	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	2-9	Fine sandy loam, loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	9-21	Loam, fine sandy loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-10
	27-80	Weathered bedrock			---	---	---	---	---
MwD:									
Micaville, stony	0-3	Gravelly coarse sandy loam	SC-SM, SM	A-2-4, A-4	0-6	0-14	83-100	44-100	24-69
	3-37	Gravelly coarse sandy loam, sandy loam, coarse sandy loam	SC-SM, SM	A-2-4, A-4	0-5	0-12	84-100	48-100	28-73
	37-51	Gravelly sandy loam, gravelly loamy sand, sandy loam	SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-13	79-100	45-100	32-86
	51-80	Weathered bedrock			---	---	---	---	---
Brownwood, stony	0-5	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-6	83-100	63-100	54-10
	5-27	Loam, fine sandy loam, gravelly loam	SC-SM, SM	A-2-4, A-4	0-5	0-12	78-98	48-98	37-95
	27-80	Weathered bedrock			---	---	---	---	---
MwE:									
Micaville, stony	0-3	Gravelly coarse sandy loam	SC-SM, SM	A-2-4, A-4	0-6	0-14	83-100	44-100	24-69
	3-37	Gravelly coarse sandy loam, sandy loam, coarse sandy loam	SC-SM, SM	A-2-4, A-4	0-5	0-12	84-100	48-100	28-73
	37-51	Gravelly sandy loam, gravelly loamy sand, sandy loam	SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-13	79-100	45-100	32-86
	51-80	Weathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
MwE:									
Brownwood, stony	0-5	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-6	83-100	63-100	54-10
	5-27	Loam, fine sandy loam, gravelly loam	SC-SM, SM	A-2-4, A-4	0-5	0-12	78-98	48-98	37-95
	27-80	Weathered bedrock			---	---	---	---	---
MwF:									
Micaville, stony	0-3	Gravelly coarse sandy loam	SC-SM, SM	A-2-4, A-4	0-6	0-14	83-100	44-100	24-69
	3-37	Gravelly coarse sandy loam, sandy loam, coarse sandy loam	SC-SM, SM	A-2-4, A-4	0-5	0-12	84-100	48-100	28-73
	37-51	Gravelly sandy loam, gravelly loamy sand, sandy loam	SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-13	79-100	45-100	32-86
	51-80	Weathered bedrock			---	---	---	---	---
Brownwood, stony	0-5	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-6	83-100	63-100	54-10
	5-27	Loam, fine sandy loam, gravelly loam	SC-SM, SM	A-2-4, A-4	0-5	0-12	78-98	48-98	37-95
	27-80	Weathered bedrock			---	---	---	---	---
NkA:									
Nikwasi, frequently flooded--------	0-26	Fine sandy loam	SM	A-2-4, A-4	0	0-5	90-100	71-100	60-98
	26-80	Extremely gravelly coarse sand, very gravelly sand, very cobbly loamy sand	GM, GP-GM, SM, SP-SM	A-1-a, A-1-b	0-5	11-48	50-89	7-89	3-43

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
NtD:									
Northcove, very stony----------	0-3	Very cobbly loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-4	5-10	23-52	58-98	24-98	17-83
	3-60	Very cobbly sandy loam, very stony loam, very flaggy loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-4	13-34	22-50	54-100	15-100	11-85
	60-80	Very cobbly sandy loam, very stony loamy sand, extremely stony sand	GC-GM, GM, SC-SM	A-1-b, A-2-4	17-40	22-59	58-100	15-100	10-86
Maymead, very stony----------	0-5	Loam, fine sandy loam	CL-ML, ML, SM	A-6, A-4	0	0-5	84-95	71-95	55-93
	5-80	Gravelly loam, cobbly loam, cobbly sandy loam	CL, GM, ML, SM	A-4	0	10-24	75-93	53-93	42-91
NtE:									
Northcove, very stony----------	0-3	Very cobbly loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-4	5-10	23-52	58-98	24-98	17-83
	3-60	Very cobbly sandy loam, very stony loam, very flaggy loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-4	13-34	22-50	54-100	15-100	11-85
	60-80	Very cobbly sandy loam, very stony loamy sand, extremely stony sand	GC-GM, GM, SC-SM	A-1-b, A-2-4	17-40	22-59	58-100	15-100	10-86
Maymead, very stony----------	0-5	Loam, fine sandy loam	CL-ML, ML, SM	A-4, A-6	0	0-5	84-95	71-95	55-93
	5-80	Gravelly loam, cobbly loam, cobbly sandy loam	CL, GM, ML, SM	A-4	0	10-24	75-93	53-93	42-91
OwC:									
Oconaluftee, windswept------	0-12	Channery clay loam, channery loam	GM, ML, SM, OH	A-7-5, A-5	0-6	6-17	73-95	36-95	28-95
	12-44	Channery loam, channery silt loam, channery fine sandy loam	GM, ML, SM, CL, SC	A-4, A-6	0-5	5-15	75-96	40-96	32-90
	44-80	Fine sandy loam, flaggy fine sandy loam, channery fine sandy loam	ML, SC-SM, SM, CL	A-4, A-6	0-5	5-14	89-100	77-100	63-95

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
OwC:									
Guyot, windswept	0-11	Loam, clay loam	CL	A-4, A-6	0	0-19	77-100	77-100	64-10
	11-28	Fine sandy loam, loam	ML, CL	A-4	0	0-11	87-100	87-100	70-10
	28-54	Fine sandy loam, loam, sandy loam	SM, SC-SM	A-4, A-2-4	0	0-12	87-100	86-100	77-99
	54-80	Weathered bedrock			---	---	---	---	---
Cataloochee, windswept------	0-9	Loam, channery loam, clay loam, channery clay loam	ML	A-7-5	0	0-19	77-100	76-100	61-97
	9-19	Channery loam, loam	CL	A-6, A-4	0	8-22	72-91	71-90	60-85
	19-31	Channery sandy loam, channery fine sandy loam	SM, SC-SM	A-2-4, A-4, A-6	0	15-24	69-83	69-82	60-82
	31-80	Weathered bedrock			---	---	---	---	---
OwD:									
Oconaluftee, windswept------	0-12	Channery clay loam, channery loam	GM, ML, SM, OH	A-7-5, A-5	0-6	6-17	73-95	36-95	28-95
	12-44	Channery loam, channery silt loam, channery fine sandy loam	GM, ML, SM, CL, SC	A-4, A-6	0-5	5-15	75-96	40-96	32-90
	44-80	Fine sandy loam, flaggy fine sandy loam, channery fine sandy loam	ML, SC-SM, SM, CL	A-4, A-6	0-5	5-14	89-100	77-100	63-95
Guyot, windswept	0-11	Loam, clay loam	CL	A-4, A-6	0	0-19	77-100	77-100	64-10
	11-28	Fine sandy loam, loam	ML, CL	A-4	0	0-11	87-100	87-100	70-10
	28-54	Fine sandy loam, loam, sandy loam	SM, SC-SM	A-4, A-2-4	0	0-12	87-100	86-100	77-99
	54-80	Weathered bedrock			---	---	---	---	---
Cataloochee, windswept------	0-9	Loam, channery loam, clay loam, channery clay loam	ML	A-7-5	0	0-19	77-100	76-100	61-97
	9-19	Channery loam, loam	CL	A-6, A-4	0	8-22	72-91	71-90	60-85
	19-31	Channery sandy loam, channery fine sandy loam	SM, SC-SM	A-2-4, A-4, A-6	0	15-24	69-83	69-82	60-82
	31-80	Weathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
OwE:									
Oconaluftee, windswept------	0-12	Channery clay loam, channery loam	GM, ML, SM, OH	A-7-5, A-5	0-6	6-17	73-95	36-95	28-95
	12-44	Channery loam, channery silt loam, channery fine sandy loam	GM, ML, SM, CL, SC	A-4, A-6	0-5	5-15	75-96	40-96	32-90
	44-80	Fine sandy loam, flaggy fine sandy loam, channery fine sandy loam	ML, SC-SM, SM, CL	A-4, A-6	0-5	5-14	89-100	77-100	63-95
Guyot, windswept	0-11	Loam, clay loam	CL	A-4, A-6	0	0-19	77-100	77-100	64-10
	11-28	Fine sandy loam, loam	ML, CL	A-4	0	0-11	87-100	87-100	70-10
	28-54	Fine sandy loam, loam, sandy loam	SM, SC-SM	A-4, A-2-4	0	0-12	87-100	86-100	77-99
	54-80	Weathered bedrock			---	---	---	---	---
Cataloochee, windswept------	0-9	Loam, channery loam, clay loam, channery clay loam	ML	A-7-5	0	0-19	77-100	76-100	61-97
	9-19	Channery loam, loam	CL	A-6, A-4	0	8-22	72-91	71-90	60-85
	19-31	Channery sandy loam, channery fine sandy loam	SM, SC-SM	A-2-4, A-4, A-6	0	15-24	69-83	69-82	60-82
	31-80	Weathered bedrock			---	---	---	---	---
OwF:									
Oconaluftee, windswept------	0-12	Channery clay loam, channery loam	GM, ML, SM, OH	A-7-5, A-5	0-6	6-17	73-95	36-95	28-95
	12-44	Channery loam, channery silt loam, channery fine sandy loam	GM, ML, SM, CL, SC	A-4, A-6	0-5	5-15	75-96	40-96	32-90
	44-80	Fine sandy loam, flaggy fine sandy loam, channery fine sandy loam	ML, SC-SM, SM, CL	A-4, A-6	0-5	5-14	89-100	77-100	63-95
Guyot, windswept	0-11	Loam, clay loam	CL	A-4, A-6	0	0-19	77-100	77-100	64-10
	11-28	Fine sandy loam, loam	ML, CL	A-4	0	0-11	87-100	87-100	70-10
	28-54	Fine sandy loam, loam, sandy loam	SM, SC-SM	A-4, A-2-4	0	0-12	87-100	86-100	77-99
	54-80	Weathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
OwF:									
Cataloochee, windswept------	0-9	Loam, channery loam, clay loam, channery clay loam	ML	A-7-5	0	0-19	77-100	76-100	61-97
	9-19	Channery loam, loam	CL	A-6, A-4	0	8-22	72-91	71-90	60-85
	19-31	Channery sandy loam, channery fine sandy loam	SM, SC-SM	A-2-4, A-4, A-6	0	15-24	69-83	69-82	60-82
	31-80	Weathered bedrock			---	---	---	---	---
Pg:									
Pits, gravel----	0-6	Extremely gravelly coarse sand, extremely gravelly sand	GP, GW	A-1-a	---	---	---	---	---
	6-80	Extremely gravelly sand, extremely gravelly coarse sand	SW, GP, GW, SP	A-1-a	---	---	---	---	---
Pt:									
Pits, quarry----	0-80	Bedrock			---	---	---	---	---
PwC:									
Porters, stony--	0-9	Loam	ML	A-4	0	0-5	86-100	69-100	56-94
	9-54	Gravelly loam, loam, sandy loam	SC-SM, SM, CL-ML, ML	A-6, A-4	0-5	0-16	80-100	47-100	37-97
	54-80	Unweathered bedrock			---	---	---	---	---
Unaka, stony----	0-9	Loam	ML, SM	A-4, A-5	0	0-5	92-98	72-98	59-92
	9-27	Gravelly loam, loam, sandy loam	CL-ML, ML, SM	A-4, A-6, A-2-4	0	0-17	86-96	63-96	49-93
	27-31	Weathered bedrock			---	---	---	---	---
	31-80	Unweathered bedrock			---	---	---	---	---
PwD:									
Porters, stony--	0-9	Loam	ML	A-4	0	0-5	86-100	69-100	56-94
	9-54	Gravelly loam, loam, sandy loam	SC-SM, SM, CL-ML, ML	A-6, A-4	0-5	0-16	80-100	47-100	37-97
	54-80	Unweathered bedrock			---	---	---	---	---
Unaka, stony----	0-9	Loam	ML, SM	A-4, A-5	0	0-5	92-98	72-98	59-92
	9-27	Gravelly loam, loam, sandy loam	CL-ML, ML, SM	A-4, A-6, A-2-4	0	0-17	86-96	63-96	49-93
	27-31	Weathered bedrock			---	---	---	---	---
	31-80	Unweathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number-: 4	10	40
	In				Pct	Pct			
PwE:									
Porters, stony--	0-9	Loam	ML	A-4	0	0-5	86-100	69-100	56-94
	9-54	Gravelly loam, loam, sandy loam	CL-ML, ML, SC-SM, SM	A-6, A-4	0-5	0-16	80-100	47-100	37-97
	54-80	Unweathered bedrock			---	---	---	---	---
Unaka, stony----	0-9	Loam	ML, SM	A-4, A-5	0	0-5	92-98	72-98	59-92
	9-27	Gravelly loam, loam, sandy loam	CL-ML, ML, SM	A-4, A-6, A-2-4	0	0-17	86-96	63-96	49-93
	27-31	Weathered bedrock			---	---	---	---	---
	31-80	Unweathered bedrock			---	---	---	---	---
PxF:									
Porters, rocky--	0-9	Loam	ML	A-4	0	0-5	86-100	69-100	56-94
	9-54	Gravelly loam, loam, sandy loam	SC-SM, SM, CL-ML, ML	A-2-4, A-4	0-5	0-16	80-100	47-100	37-97
	54-80	Unweathered bedrock			---	---	---	---	---
Unaka, rocky----	0-9	Loam	ML, SM	A-4, A-5	0	0-5	92-98	72-98	59-92
	9-27	Gravelly loam, loam, sandy loam	CL-ML, ML, SM	A-4, A-6, A-2-4	0	0-17	86-96	63-96	49-93
	27-31	Weathered bedrock			---	---	---	---	---
	31-80	Unweathered bedrock			---	---	---	---	---
RdA:									
Reddies, occasionally flooded--------	0-14	Loam, fine sandy loam, sandy loam	ML, SM	A-4	0	0-5	90-100	71-100	58-94
	14-26	Fine sandy loam, sandy loam, gravelly sandy loam	SM	A-1-b, A-2-4, A-4	0-1	0-13	75-100	41-100	35-98
	26-80	Extremely gravelly sand, very gravelly sand, very cobbly sand	GP, GP-GM, SP-SM	A-1-a, A-1-b	0-5	10-40	47-89	7-89	5-70
RkF:									
Rock outcrop----	0-80	Bedrock			---	---	---	---	---
Cleveland, very bouldery-------	0-5	Sandy loam	SM, SC-SM	A-2-4, A-4	0	0-5	82-100	63-100	44-84
	5-14	Sandy loam	SM, SC-SM	A-2-4, A-4	0	0-5	82-100	63-100	44-84
	14-80	Unweathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
RoF:									
Rock outcrop----	0-80	Bedrock			---	---	---	---	---
Oteen, very bouldery-------	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	2-11	Fine sandy loam, sandy loam, loam	SC-SM, SM	A-2-4, A-4	0	0-5	87-100	70-100	59-10
	11-15	Very gravelly sandy loam, gravelly fine sandy loam, gravelly loam	GM, SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	25-81
	15-80	Weathered bedrock			---	---	---	---	---
RsA:									
Rosman, occasionally flooded--------	0-10	Fine sandy loam	SC-SM, SM	A-2-4, A-2-5, A-4	0	0	94-100	83-100	73-98
	10-59	Fine sandy loam, sandy loam, loam	SC-SM, SM, ML	A-2-4, A-4	0	0	94-100	83-100	70-98
	59-80	Fine sandy loam, sandy loam, loam	SC-SM, SM, ML	A-2-4, A-4	0	0	94-100	83-100	70-98
SoD:									
Soco, stony-----	0-2	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	2-33	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	33-80	Weathered bedrock			---	---	---	---	---
Stecoah, stony--	0-5	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	5-47	Sandy loam, loam, fine sandy loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	47-80	Weathered bedrock			---	---	---	---	---
SoE:									
Soco, stony-----	0-2	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	2-33	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	33-80	Weathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
SoE:									
Stecoah, stony--	0-5	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	5-47	Sandy loam, fine sandy loam, loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	47-80	Weathered bedrock			---	---	---	---	---
SoF:									
Soco, stony-----	0-2	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	2-33	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	33-80	Weathered bedrock			---	---	---	---	---
Stecoah, stony--	0-5	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	5-47	Sandy loam, fine sandy loam, loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	47-80	Weathered bedrock			---	---	---	---	---
StB:									
Statler, rarely flooded--------	0-10	Fine sandy loam, sandy loam	CL, ML	A-4, A-6	0	0	95-100	72-100	62-10
	10-50	Clay loam, silt loam, loam	CL	A-6	0	0	95-100	72-100	57-96
	50-80	Sandy clay loam, clay loam, loam	CL	A-4, A-6, A-7-6	0	0-5	95-100	72-100	58-10
SyD:									
Sylco, stony----	0-5	Channery loam	GM, MH, ML, SM	A-4, A-5, A-7-5	0-5	5-15	70-95	55-90	40-80
	5-23	Very channery loam	CL, GC, GC-GM, SC-SM	A-2-4, A-4	0-5	5-15	66-87	26-87	21-87
	23-80	Unweathered bedrock			---	---	---	---	---
Soco, stony-----	0-5	Channery fine sandy loam, channery loam	GM, ML, SM	A-4, A-5	4-18	4-28	68-98	67-98	55-93
	5-24	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	24-35	Channery fine sandy loam, channery loam, channery silt loam	CL, ML, SC, SM	A-4, A-6	4-17	4-27	69-98	68-98	56-93
	35-80	Weathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
SyE:									
Sylco, stony----	0-5	Channery loam	GM, MH, ML, SM	A-4, A-5, A-7-5	0-5	5-15	70-95	55-90	40-80
	5-23	Very channery loam	CL, GC, GC-GM, SC-SM	A-2-4, A-4	0-5	5-15	66-87	26-87	21-87
	23-80	Unweathered bedrock			---	---	---	---	---
Soco, stony-----	0-5	Channery fine sandy loam, channery loam	GM, ML, SM	A-4, A-5	4-18	4-28	68-98	67-98	55-93
	5-24	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	24-35	Channery fine sandy loam, channery loam, channery silt loam	CL, ML, SC, SM	A-4, A-6	4-17	4-27	69-98	68-98	56-93
	35-80	Weathered bedrock			---	---	---	---	---
SzF:									
Sylco, very stony----------	0-5	Channery loam	MH, ML, SM, GM	A-4, A-5, A-7-5	0-5	5-15	70-95	55-90	40-80
	5-23	Very channery loam	CL, GC, GC-GM, SC-SM	A-2-4, A-4	0-5	5-15	66-87	26-87	21-87
	23-80	Unweathered bedrock			---	---	---	---	---
Soco, very stony	0-5	Channery fine sandy loam, channery loam	GM, ML, SM	A-4, A-5	4-18	4-28	68-98	67-98	55-93
	5-24	Fine sandy loam, loam, silt loam	CL, ML	A-4, A-6	0-4	1-11	91-98	90-98	74-93
	24-35	Channery fine sandy loam, channery loam, channery silt loam	CL, ML, SC, SM	A-4, A-6	4-17	4-27	69-98	68-98	56-93
	35-80	Weathered bedrock			---	---	---	---	---
TaB:									
Tate------------	0-7	Loam, fine sandy loam	ML, SM, CL-ML	A-4, A-6	0	0-5	84-95	71-95	55-93
	7-46	Clay loam, sandy clay loam, loam	SC-SM, CL	A-6	0-5	0-14	94-100	80-100	67-98
	46-80	Gravelly loam, cobbly loam, cobbly sandy loam	CL, GM, ML, SM	A-4	0	10-24	75-93	53-93	42-91
TaC:									
Tate------------	0-7	Loam, fine sandy loam	ML, SM, CL-ML	A-4, A-6	0	0-5	84-95	71-95	55-93
	7-46	Clay loam, sandy clay loam, loam	SC-SM, CL	A-6	0-5	0-14	94-100	80-100	67-98
	46-80	Gravelly loam, cobbly loam, cobbly sandy loam	CL, GM, ML, SM	A-4	0	10-24	75-93	53-93	42-91

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage pass sieve number-: 4	10	40
	In				Pct	Pct			
TaD:									
Tate------------	0-7	Loam, fine sandy loam	ML, SM, CL-ML	A-4, A-6	0	0-5	84-95	71-95	55-93
	7-46	Clay loam, sandy clay loam, loam	CL, SC-SM	A-6	0-5	0-14	94-100	80-100	67-98
	46-80	Gravelly loam, cobbly loam, cobbly sandy loam	CL, GM, ML, SM	A-4	0	10-24	75-93	53-93	42-91
TkC:									
Tate, very stony	0-7	Loam, fine sandy loam	ML, SM, CL-ML	A-4, A-6	0	0-5	84-95	71-95	55-93
	7-46	Gravelly sandy clay loam, gravelly sandy loam, clay loam	SC	A-2-6, A-6, A-7-6	0-1	0-13	71-92	37-76	29-72
	46-80	Gravelly loam, cobbly loam, cobbly sandy loam	CL, GM, ML, SM	A-4	0	10-24	75-93	53-93	42-91
TkD:									
Tate, very stony	0-7	Loam, fine sandy loam	ML, SM, CL-ML	A-4, A-6	0	0-5	84-95	71-95	55-93
	7-46	Gravelly sandy clay loam, gravelly sandy loam, clay loam	SC	A-2-6, A-6, A-7-6	0-1	0-13	71-92	37-76	29-72
	46-80	Gravelly loam, cobbly loam, cobbly sandy loam	CL, GM, ML, SM	A-4	0	10-24	75-93	53-93	42-91
TmB:									
Tate------------	0-7	Loam, fine sandy loam	ML, SM, CL-ML	A-4, A-6	0	0-5	84-95	71-95	55-93
	7-46	Clay loam, sandy clay loam, loam	CL, SC-SM	A-6	0-5	0-14	94-100	80-100	67-98
	46-80	Fine sandy loam, gravelly fine sandy loam, cobbly fine sandy loam	SC-SM, SM	A-2-4, A-2-6, A-4	0-8	0-30	84-100	69-100	57-98
Urban land.									
TmC:									
Tate------------	0-7	Loam, fine sandy loam	ML, SM, CL-ML	A-4, A-6	0	0-5	84-95	71-95	55-93
	7-46	Clay loam, sandy clay loam, loam	CL, SC-SM	A-6	0-5	0-14	94-100	80-100	67-98
	46-80	Fine sandy loam, gravelly fine sandy loam, cobbly fine sandy loam	SC-SM, SM	A-2-4, A-2-6, A-4	0-8	0-30	84-100	69-100	57-98
Urban land.									

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage pass sieve number-: 4	10	40
	In				Pct	Pct			
TmD:									
Tate------------	0-7	Loam, fine sandy loam	ML, SM, CL-ML	A-4, A-6	0	0-5	84-95	71-95	55-93
	7-46	Clay loam, sandy clay loam, loam	CL, SC-SM	A-6	0-5	0-14	94-100	80-100	67-98
	46-80	Fine sandy loam, gravelly fine sandy loam, cobbly fine sandy loam	SC-SM, SM	A-2-4, A-2-6, A-4	0-8	0-30	84-100	69-100	57-98
Urban land.									
TnE:									
Toecane, extremely bouldery-------	0-8	Very cobbly loam	SC-SM, SM	A-2-4, A-4	5-22	32-50	67-98	26-98	21-95
	8-24	Very cobbly sandy clay loam, very cobbly loam, very cobbly fine sandy loam	GC-GM, SC-SM, SC	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	22-96
	24-30	Very cobbly sandy loam, very cobbly fine sandy loam, extremely cobbly loamy fine sand	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	19-82
	30-80	Extremely cobbly loamy sand, extremely cobbly loamy fine sand, very stony sandy loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4	5-23	33-76	55-81	10-61	8-55
ToC:									
Toecane, bouldery-------	0-8	Cobbly loam, very cobbly loam, cobbly fine sandy loam, very cobbly fine sandy loam	SC-SM, SM	A-2-4, A-5, A-4	1-11	11-43	73-98	47-98	38-92
	8-24	Very cobbly loam, very cobbly sandy clay loam, very cobbly fine sandy loam, very cobbly sandy loam	GC-GM, SC, SC-SM	A-1-b, A-2-4, A-4, A-6	5-19	31-52	67-98	27-98	22-93
	24-30	Very cobbly sandy loam, very cobbly fine sandy loam, extremely cobbly loamy fine sand, very stony sandy loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-4	5-19	31-52	66-98	22-98	15-82
	30-80	Extremely cobbly loamy sand, extremely cobbly loamy fine sand, very stony sandy loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-1-a	5-23	34-59	61-100	17-100	13-89

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
ToC:									
Tusquitee, bouldery-------	0-9	Loam	MH, ML	A-4, A-5	0-2	0-11	86-100	66-100	54-94
	9-88	Fine sandy loam, sandy loam, loam, sandy clay loam	ML, SC-SM, SM	A-4	0-1	0-15	90-100	69-100	58-10
TpD:									
Toecane, very bouldery-------	0-8	Cobbly loam, very cobbly loam, cobbly fine sandy loam, very cobbly fine sandy loam	SC-SM, SM	A-2-4, A-5, A-4	1-11	11-43	73-98	47-98	38-92
	8-24	Very cobbly loam, very cobbly sandy clay loam, very cobbly fine sandy loam, very cobbly sandy loam	GC-GM, SC, SC-SM	A-1-b, A-2-4, A-4, A-6	5-19	31-52	67-98	27-98	22-93
	24-30	Very cobbly sandy loam, very cobbly fine sandy loam, extremely cobbly loamy fine sand, very stony sandy loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-4	5-19	31-52	66-98	22-98	15-82
	30-80	Extremely cobbly loamy sand, extremely cobbly loamy fine sand, very stony sandy loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-1-a	5-23	34-59	61-100	17-100	13-89
Tusquitee, very bouldery-------	0-8	Gravelly loam	SC-SM, SM	A-2-4, A-4	0-2	5-15	73-86	51-86	41-82
	8-48	Loam, gravelly loam, sandy loam	ML, SC-SM, SM	A-4	0-1	0-16	90-100	58-100	47-94
	48-80	Gravelly fine sandy loam, gravelly sandy loam, cobbly fine sandy loam	GC-GM, GM, SC-SM, SM	A-2-4, A-4	0-12	5-21	59-98	16-98	14-98

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
TpE:									
Toecane, very bouldery-------	0-8	Cobbly loam, very cobbly loam, cobbly fine sandy loam, very cobbly fine sandy loam	SC-SM, SM	A-2-4, A-5, A-4	1-11	11-43	73-98	47-98	38-92
	8-24	Very cobbly loam, very cobbly sandy clay loam, very cobbly fine sandy loam, very cobbly sandy loam	GC-GM, SC, SC-SM	A-1-b, A-2-4, A-4, A-6	5-19	31-52	67-98	27-98	22-93
	24-30	Very cobbly sandy loam, very cobbly fine sandy loam, extremely cobbly loamy fine sand, very stony sandy loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-4	5-19	31-52	66-98	22-98	15-82
	30-80	Extremely cobbly loamy sand, extremely cobbly loamy fine sand, very stony sandy loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-1-a	5-23	34-59	61-100	17-100	13-89
Tusquitee, very bouldery-------	0-8	Gravelly loam	SC-SM, SM	A-2-4, A-4	0-2	5-15	73-86	51-86	41-82
	8-48	Loam, gravelly loam, sandy loam	ML, SC-SM, SM	A-4	0-1	0-16	90-100	58-100	47-94
	48-80	Gravelly fine sandy loam, gravelly sandy loam, cobbly fine sandy loam	GC-GM, GM, SC-SM, SM	A-2-4, A-4	0-12	5-21	59-98	16-98	14-98
TsA:									
Toxaway, frequently flooded--------	0-26	Loam	MH, ML	A-4, A-6, A-7-5	0	0	98-100	93-100	72-98
	26-80	Stratified sandy clay loam to sand	CL, ML, SC, SM	A-2-4, A-4, A-6	0	5-12	95-100	81-100	52-89

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage pass sieve number-: 4	10	40
	In				Pct	Pct			
TtE:									
Trimont, stony--	0-9	Gravelly loam	ML, SM	A-1-b, A-2-4, A-4, A-5	0-2	5-15	70-85	60-75	30-65
	9-45	Sandy clay loam, clay loam, loam	CL, ML, SC, SM	A-4, A-6, A-7-5	0	0-5	90-100	85-100	75-90
	45-80	Fine sandy loam, gravelly sandy loam, loam, sandy loam	SC-SM, SM, ML	A-1-b, A-2-4, A-4, A-5	0-2	0-15	70-100	60-100	30-85
TuD:									
Tusquitee, stony	0-8	Gravelly loam	SC-SM, SM	A-2-4, A-4	0-2	5-15	73-86	51-86	41-82
	8-48	Loam, gravelly loam, sandy loam	ML, SC-SM, SM	A-4	0-1	0-16	90-100	58-100	47-94
	48-80	Gravelly fine sandy loam, gravelly sandy loam, cobbly fine sandy loam	GC-GM, GM, SC-SM, SM	A-2-4, A-4	0-12	5-21	59-98	16-98	14-98
Toecane, stony--	0-8	Cobbly loam	SC-SM, SM	A-2-4, A-4	1-10	22-32	76-98	52-98	42-96
	8-24	Very cobbly sandy clay loam, very cobbly loam, very cobbly fine sandy loam	SC-SM, SC, GC-GM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	22-96
	24-30	Very cobbly sandy loam, very cobbly fine sandy loam, extremely cobbly loamy fine sand	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-4	5-20	30-48	67-98	28-98	19-82
	30-80	Extremely cobbly loamy sand, extremely cobbly loamy fine sand, very stony sandy loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4	5-23	33-76	55-81	10-61	8-55
TwB:									
Tusquitee-------	0-8	Loam, fine sandy loam	ML, SM	A-2-4, A-4	0	0-5	83-100	75-100	54-10
	8-48	Loam, gravelly loam, sandy loam	ML, SC-SM, SM	A-4	0-1	0-16	90-100	58-100	47-94
	48-80	Gravelly fine sandy loam, gravelly sandy loam, cobbly fine sandy loam	GC-GM, GM, SC-SM, SM	A-2-4, A-4	0-12	5-21	59-98	16-98	14-98
Whiteside-------	0-11	Loam	ML, SM	A-2-4, A-4, A-5	0	0-5	90-100	70-100	53-89
	11-37	Loam, sandy clay loam	SC-SM	A-2-6, A-6	0	0-5	90-100	71-100	57-89
	37-80	Fine sandy loam, sandy clay loam, sandy loam	SC-SM	A-2-4, A-4	0	0-5	90-100	72-100	61-10

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
TwC:									
Tusquitee-------	0-8	Loam, fine sandy loam	ML, SM	A-2-4, A-4	0	0-5	83-100	75-100	54-10
	8-48	Loam, gravelly loam, sandy loam	ML, SC-SM, SM	A-4	0-1	0-16	90-100	58-100	47-94
	48-80	Gravelly fine sandy loam, gravelly sandy loam, cobbly fine sandy loam	GC-GM, GM, SC-SM, SM	A-2-4, A-4	0-12	5-21	59-98	16-98	14-98
Whiteside-------	0-11	Loam	ML, SM	A-2-4, A-4, A-5	0	0-5	90-100	70-100	53-89
	11-37	Loam, sandy clay loam	SC-SM	A-2-6, A-6	0	0-5	90-100	71-100	57-89
	37-80	Fine sandy loam, sandy clay loam, sandy loam	SC-SM	A-2-4, A-4	0	0-5	90-100	72-100	61-10
UcB:									
Udifluvents, frequently flooded--------	0-80	Loamy sand, sand, fine sand	SM	A-2-4	0	0-7	95-100	81-100	64-83
Ud:									
Udorthents, loamy----------	0-80	Sandy clay loam, sandy loam, clay loam	CL, CL-ML, SC, SC-SM	A-2-4, A-4, A-6, A-7-6	0	0-3	95-100	85-100	60-10
UfB:									
Udorthents, occasionally flooded--------	0-80	Sandy loam	CL, CL-ML, SC, SC-SM	A-2-4, A-4, A-6, A-7-6	0	0-3	95-100	84-100	51-97
Urban land, occasionally flooded.									
UhE:									
Udorthents, rocky----------	0-80	Sandy loam	CL, CL-ML, SC, SC-SM	A-2-4, A-4, A-6, A-7-6	0	0-3	95-100	84-100	51-97
Urban land.									

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
UkD:									
Unaka, very bouldery-------	0-9	Loam	ML, SM	A-4, A-5	0	0-5	92-98	72-98	59-92
	9-27	Gravelly loam, loam, sandy loam	CL-ML, ML, SM	A-4, A-6, A-2-4	0	0-17	86-96	63-96	49-93
	27-31	Weathered bedrock			---	---	---	---	---
	31-80	Unweathered bedrock			---	---	---	---	---
Rock outcrop----	0-80	Bedrock			---	---	---	---	---
UkE:									
Unaka, very bouldery-------	0-9	Loam	ML, SM	A-4, A-5	0	0-5	92-98	72-98	59-92
	9-27	Gravelly loam, loam, sandy loam	CL-ML, ML, SM	A-4, A-6, A-2-4	0	0-17	86-96	63-96	49-93
	27-31	Weathered bedrock			---	---	---	---	---
	31-80	Unweathered bedrock			---	---	---	---	---
Rock outcrop----	0-80	Bedrock			---	---	---	---	---
UkF:									
Unaka, very bouldery-------	0-9	Loam	ML, SM	A-4, A-5	0	0-5	92-98	72-98	59-92
	9-27	Gravelly loam, loam, sandy loam	CL-ML, ML, SM	A-4, A-6, A-2-4	0	0-17	86-96	63-96	49-93
	27-31	Weathered bedrock			---	---	---	---	---
	31-80	Unweathered bedrock			---	---	---	---	---
Rock outcrop----	0-80	Bedrock			---	---	---	---	---
UnB:									
Unison----------	0-10	Loam, fine sandy loam	CL, CL-ML, ML	A-4, A-6	0	0-11	90-100	79-100	64-96
	10-49	Clay, clay loam, sandy clay loam	CH, CL	A-6, A-7-6	0	0-12	89-100	79-100	57-100
	49-80	Very gravelly clay loam, gravelly sandy clay loam, gravelly clay loam	SC, SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	29-93
UnC:									
Unison----------	0-10	Loam, fine sandy loam	CL, CL-ML, ML	A-4, A-6	0	0-11	90-100	79-100	64-96
	10-49	Clay, clay loam, sandy clay loam	CH, CL	A-6, A-7-6	0	0-12	89-100	79-100	57-100
	49-80	Very gravelly clay loam, gravelly sandy clay loam, gravelly clay loam	SC, SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	29-93

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
UnD:									
Unison----------	0-10	Loam, fine sandy loam	CL, CL-ML, ML	A-4, A-6	0	0-11	90-100	79-100	64-96
	10-49	Clay, clay loam, sandy clay loam	CH, CL	A-6, A-7-6	0	0-12	89-100	79-100	57-10
	49-80	Very gravelly clay loam, gravelly sandy clay loam, gravelly clay loam	GM, SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	29-93
UrB:									
Unison----------	0-10	Loam, fine sandy loam	CL, CL-ML, ML	A-4, A-6	0	0-11	90-100	79-100	64-96
	10-88	Clay, clay loam, sandy clay loam	CH, CL	A-6, A-7-6	0	0-12	89-100	79-100	57-10
Urban land.									
UrC:									
Unison----------	0-10	Loam, fine sandy loam	CL, CL-ML, ML	A-4, A-6	0	0-11	90-100	79-100	64-96
	10-88	Clay, clay loam, sandy clay loam	CH, CL	A-6, A-7-6	0	0-12	89-100	79-100	57-10
Urban land.									
Ux.									
Urban land									
W.									
Water									
WaC2:									
Walnut, moderately eroded---------	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	2-21	Loam, fine sandy loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-10
	27-80	Weathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
WaC2:									
Oteen, moderately eroded---------	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	2-11	Fine sandy loam, sandy loam, loam	SC-SM, SM	A-2-4, A-4	0	0-5	87-100	70-100	59-10
	11-15	Very gravelly sandy loam, gravelly fine sandy loam, gravelly loam	GM, SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	25-81
	15-80	Weathered bedrock			---	---	---	---	---
Mars Hill, moderately eroded---------	0-3	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	3-35	Fine sandy loam, loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	57-97
	35-46	Fine sandy loam, sandy loam, gravelly sandy loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-10
	46-80	Weathered bedrock			---	---	---	---	---
WaD2:									
Walnut, moderately eroded---------	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	2-21	Loam, fine sandy loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-10
	27-80	Weathered bedrock			---	---	---	---	---
Oteen, moderately eroded---------	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	2-11	Fine sandy loam, sandy loam, loam	SC-SM, SM	A-2-4, A-4	0	0-5	87-100	70-100	59-10
	11-15	Very gravelly sandy loam, gravelly fine sandy loam, gravelly loam	GM, SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	25-81
	15-80	Weathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
WaD2: Mars Hill, moderately eroded---------	0-3	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	3-35	Fine sandy loam, loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	57-97
	35-46	Fine sandy loam, sandy loam, gravelly sandy loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-10
	46-80	Weathered bedrock			---	---	---	---	---
WaE2: Walnut, moderately eroded---------	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	2-21	Loam, fine sandy loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-10
	27-80	Weathered bedrock			---	---	---	---	---
Oteen, moderately eroded---------	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	2-11	Fine sandy loam, sandy loam, loam	SC-SM, SM	A-2-4, A-4	0	0-5	87-100	70-100	59-10
	11-15	Very gravelly sandy loam, gravelly fine sandy loam, gravelly loam	GM, SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	25-81
	15-80	Weathered bedrock			---	---	---	---	---
Mars Hill, moderately eroded---------	0-3	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	3-35	Fine sandy loam, loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	57-97
	35-46	Fine sandy loam, sandy loam, gravelly sandy loam	SM, SC-SM	A-4, A-2-4	0-1	0-9	73-100	41-100	35-10
	46-80	Weathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
WnF:									
Walnut----------	0-3	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	3-9	Fine sandy loam, loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	9-21	Loam, fine sandy loam, sandy loam	ML, SC-SM, SM	A-4	0	0-5	87-100	70-100	56-95
	21-27	Gravelly fine sandy loam, gravelly sandy loam, loam	SC-SM, SM	A-2-4, A-4	0-1	0-9	73-100	41-100	35-10
	27-80	Weathered bedrock			---	---	---	---	---
Oteen-----------	0-2	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0-2	0-5	85-100	80-95	60-80
	2-11	Fine sandy loam, sandy loam, loam	SC-SM, SM	A-2-4, A-4	0	0-5	87-100	70-100	59-10
	11-15	Very gravelly sandy loam, gravelly fine sandy loam, gravelly loam	GM, SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-9	72-97	36-97	25-81
	15-80	Weathered bedrock			---	---	---	---	---
Rock outcrop----	0-80	Bedrock			---	---	---	---	---
WoE:									
Wayah, bouldery-	0-14	Loam	ML, SM	A-5, A-7-5	0-4	0-6	88-100	66-100	53-96
	14-48	Sandy loam, fine sandy loam, gravelly sandy loam	SC-SM	A-1-b, A-2-4, A-4	0-3	0-12	89-100	70-100	48-84
	48-80	Gravelly sandy loam, gravelly fine sandy loam, gravelly loamy sand	GM, SM	A-1-b, A-2-4	0-5	3-14	63-90	35-90	25-75
Burton, bouldery	0-11	Cobbly loam	SM	A-2-5, A-7-5, A-5	2-12	6-35	76-96	52-96	42-90
	11-25	Cobbly sandy loam, very cobbly fine sandy loam, gravelly sandy loam	SP-SC, SC-SM, SC	A-1-b, A-2-6	0-15	9-33	64-100	31-100	21-84
	25-80	Unweathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
WpF:									
Wayah, very rocky----------	0-14	Loam	ML, SM	A-5, A-7-5	0-4	0-6	88-100	66-100	53-96
	14-48	Sandy loam, fine sandy loam, gravelly sandy loam	SC-SM	A-1-b, A-2-4, A-4	0-3	0-12	89-100	70-100	48-84
	48-80	Gravelly sandy loam, gravelly fine sandy loam, gravelly loamy sand	GM, SM	A-1-b, A-2-4	0-5	3-14	63-90	35-90	25-75
Burton, very rocky----------	0-11	Cobbly loam	SM	A-2-5, A-7-5, A-5	2-12	6-35	76-96	52-96	42-90
	11-25	Cobbly sandy loam, very cobbly fine sandy loam, gravelly sandy loam	SP-SC, SC-SM, SC	A-1-b, A-2-6	0-15	9-33	64-100	31-100	21-84
	25-80	Unweathered bedrock			---	---	---	---	---
WrC:									
Wayah, windswept	0-14	Loam	ML, SM	A-5, A-7-5	0-4	0-6	88-100	66-100	53-96
	14-48	Sandy loam, fine sandy loam, gravelly sandy loam	SC-SM	A-1-b, A-2-4, A-4	0-3	0-12	89-100	70-100	48-84
	48-80	Gravelly sandy loam, gravelly fine sandy loam, gravelly loamy sand	GM, SM	A-1-b, A-2-4	0-5	3-14	63-90	35-90	25-75
Burton, windswept------	0-15	Sandy clay loam	SM	A-2-4, A-4, A-5	0-9	0-10	80-100	60-100	48-94
	15-24	Sandy loam, loam, gravelly sandy loam	SC-SM, SM	A-4, A-2-4	0-1	0-17	76-100	51-100	37-85
	24-27	Weathered bedrock			---	---	---	---	---
	27-80	Unweathered bedrock			---	---	---	---	---
WrD:									
Wayah, windswept	0-14	Loam	ML, SM	A-5, A-7-5	0-4	0-6	88-100	66-100	53-96
	14-48	Sandy loam, fine sandy loam, gravelly sandy loam	SC-SM	A-1-b, A-2-4, A-4	0-3	0-12	89-100	70-100	48-84
	48-80	Gravelly sandy loam, gravelly fine sandy loam, gravelly loamy sand	GM, SM	A-1-b, A-2-4	0-5	3-14	63-90	35-90	25-75

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage pass sieve number-		
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40
	In				Pct	Pct			
WrD:									
Burton, windswept------	0-15	Sandy clay loam	SM	A-2-4, A-4, A-5	0-9	0-10	80-100	60-100	48-94
	15-24	Sandy loam, loam, gravelly sandy loam	SC-SM, SM	A-4, A-2-4	0-1	0-17	76-100	51-100	37-85
	24-27	Weathered bedrock			---	---	---	---	---
	27-80	Unweathered bedrock			---	---	---	---	---
WrE:									
Wayah, windswept	0-14	Loam	ML, SM	A-5, A-7-5	0-4	0-6	88-100	66-100	53-96
	14-48	Sandy loam, fine sandy loam, gravelly sandy loam	SC-SM	A-1-b, A-2-4, A-4	0-3	0-12	89-100	70-100	48-84
	48-80	Gravelly sandy loam, gravelly fine sandy loam, gravelly loamy sand	GM, SM	A-1-b, A-2-4	0-5	3-14	63-90	35-90	25-75
Burton, windswept------	0-15	Sandy clay loam	SM	A-2-4, A-4, A-5	0-9	0-10	80-100	60-100	48-94
	15-24	Sandy loam, loam, gravelly sandy loam	SC-SM, SM	A-4, A-2-4	0-1	0-17	76-100	51-100	37-85
	24-27	Weathered bedrock			---	---	---	---	---
	27-80	Unweathered bedrock			---	---	---	---	---
WsF:									
Wayah, windswept	0-14	Loam	ML, SM	A-5, A-7-5	0-4	0-6	88-100	66-100	53-96
	14-48	Sandy loam, fine sandy loam, gravelly sandy loam	SC-SM	A-1-b, A-2-4, A-4	0-3	0-12	89-100	70-100	48-84
	48-80	Gravelly sandy loam, gravelly fine sandy loam, gravelly loamy sand	GM, SM	A-1-b, A-2-4	0-5	3-14	63-90	35-90	25-75
Burton, windswept------	0-15	Sandy clay loam	SM	A-2-4, A-4, A-5	0-9	0-10	80-100	60-100	48-94
	15-24	Sandy loam, loam, gravelly sandy loam	SC-SM, SM	A-4, A-2-4	0-1	0-17	76-100	51-100	37-85
	24-27	Weathered bedrock			---	---	---	---	---
	27-80	Unweathered bedrock			---	---	---	---	---

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage pass sieve number-: 4	10	40
	In				Pct	Pct			
WtB:									
Whiteside-------	0-14	Loam	SC-SM, SM	A-4, A-5	0	0-5	90-100	71-100	58-94
	14-47	Sandy clay loam, loam, fine sandy loam	SC-SM, SC	A-2-6, A-6	0	0-5	90-100	72-100	59-91
	47-53	Sandy loam, loamy fine sand, loamy sand	SM, SC-SM	A-1-b, A-2-4	0	0-5	89-100	71-100	50-87
	53-80	Sandy clay loam, fine sandy loam, sandy loam	SC-SM	A-2-4, A-4	0	0-5	90-100	72-100	53-10
WtC:									
Whiteside-------	0-14	Loam	SC-SM, SM	A-4, A-5	0	0-5	90-100	71-100	58-94
	14-47	Sandy clay loam, loam, fine sandy loam	SC-SM, SC	A-2-6, A-6	0	0-5	90-100	72-100	59-91
	47-53	Sandy loam, loamy fine sand, loamy sand	SM, SC-SM	A-1-b, A-2-4	0	0-5	89-100	71-100	50-87
	53-80	Sandy clay loam, fine sandy loam, sandy loam	SC-SM	A-2-4, A-4	0	0-5	90-100	72-100	53-10
ZcB:									
Zillicoa--------	0-9	Loam, fine sandy loam	CL, CL-ML, ML	A-4, A-6	0	0-11	90-100	79-100	64-96
	9-36	Clay, clay loam	CH, CL	A-7-6	0	0-5	86-100	67-100	53-10
	36-48	Sandy clay loam, clay loam, gravelly sandy clay loam	CL	A-7-6, A-6	0-1	0-10	83-100	48-100	38-94
	48-80	Weathered bedrock			---	---	---	---	---
ZcC:									
Zillicoa--------	0-9	Loam, fine sandy loam	CL, CL-ML, ML	A-4, A-6	0	0-11	90-100	79-100	64-96
	9-36	Clay, clay loam	CH, CL	A-7-6	0	0-5	86-100	67-100	53-10
	36-48	Sandy clay loam, clay loam, gravelly sandy clay loam	CL	A-7-6, A-6	0-1	0-10	83-100	48-100	38-94
	48-80	Weathered bedrock			---	---	---	---	---
ZoD:									
Zillicoa, stony-	0-9	Loam, fine sandy loam	CL, CL-ML, ML	A-4, A-6	0	0-11	90-100	79-100	64-96
	9-36	Clay, clay loam	CH, CL	A-7-6	0	0-5	86-100	67-100	53-10
	36-48	Sandy clay loam, clay loam, gravelly sandy clay loam	CL	A-7-6, A-6	0-1	0-10	83-100	48-100	38-94
	48-80	Weathered bedrock			---	---	---	---	---

Table 16.—Physical and Chemical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
AcD:											
Ashe, very stony--	0-5	7-20	1.35-1.60	2-6	0.13-0.18	0.0-2.9	3.5-6.0	2.0-6.0	.10	.15	2
	5-25	7-20	1.35-1.60	2-6	0.10-0.14	0.0-2.9	3.5-6.0	0.0-1.0	.15	.17	
	25-30	5-15	1.45-1.65	2-6	0.08-0.12	0.0-2.9	3.5-6.0	0.0-0.5	.24	.37	
	30-80	---	---	---	0.00-0.00	---	---	---	---	---	
Cleveland, very stony------------	0-5	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	2.0-6.0	.20	.24	1
	5-14	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	0.0-1.0	.24	.32	
	14-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
ArE:											
Ashe, very bouldery---------	0-5	7-20	1.35-1.60	2-6	0.13-0.18	0.0-2.9	3.5-6.0	2.0-6.0	.10	.15	2
	5-25	7-20	1.35-1.60	2-6	0.10-0.14	0.0-2.9	3.5-6.0	0.0-1.0	.15	.17	
	25-30	5-15	1.45-1.65	2-6	0.08-0.12	0.0-2.9	3.5-6.0	0.0-0.5	.24	.37	
	30-80	---	---	---	0.00-0.00	---	---	---	---	---	
Cleveland, very bouldery---------	0-5	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	2.0-6.0	.20	.24	1
	5-14	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	0.0-1.0	.24	.32	
	14-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
ArF:											
Ashe, very bouldery---------	0-5	7-20	1.35-1.60	2-6	0.13-0.18	0.0-2.9	3.5-6.0	2.0-6.0	.10	.15	2
	5-25	7-20	1.35-1.60	2-6	0.10-0.14	0.0-2.9	3.5-6.0	0.0-1.0	.15	.17	
	25-30	5-15	1.45-1.65	2-6	0.08-0.12	0.0-2.9	3.5-6.0	0.0-0.5	.24	.37	
	30-80	---	---	---	0.00-0.00	---	---	---	---	---	
Cleveland, very bouldery---------	0-5	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	2.0-6.0	.20	.24	1
	5-14	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	0.0-1.0	.24	.32	
	14-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
BaD:											
Balsam, extremely bouldery---------	0-11	10-22	0.50-1.00	2-6	0.20-0.25	0.0-2.9	3.5-6.0	10-20	.02	.02	5
	11-20	15-25	1.00-1.50	2-6	0.06-0.10	0.0-2.9	3.5-6.0	4.0-10	.05	.10	
	20-42	12-22	1.00-1.50	2-6	0.06-0.10	0.0-2.9	3.5-6.0	0.0-1.0	.10	.37	
	42-80	2-15	1.20-1.60	2-6	0.04-0.09	0.0-2.9	3.5-6.0	0.0-0.5	.10	.28	
Tanasee, extremely bouldery---------	0-15	10-22	1.10-1.30	2-6	0.16-0.22	0.0-2.9	3.5-5.5	10-20	.02	.02	5
	15-28	10-25	1.35-1.60	2-6	0.12-0.18	0.0-2.9	3.5-5.5	0.0-1.0	.15	.17	
	28-80	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	3.5-5.5	0.0-0.5	.10	.24	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Soil reaction	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
BaE:											
Balsam, extremely bouldery----------	0-11	10-22	0.50-1.00	2-6	0.20-0.25	0.0-2.9	3.5-6.0	10-20	.02	.02	5
	11-20	15-25	1.00-1.50	2-6	0.06-0.10	0.0-2.9	3.5-6.0	4.0-10	.05	.10	
	20-42	12-22	1.00-1.50	2-6	0.06-0.10	0.0-2.9	3.5-6.0	0.0-1.0	.10	.37	
	42-80	2-15	1.20-1.60	2-6	0.04-0.09	0.0-2.9	3.5-6.0	0.0-0.5	.10	.28	
Tanasee, extremely bouldery----------	0-15	10-22	1.10-1.30	2-6	0.16-0.22	0.0-2.9	3.5-5.5	10-20	.02	.02	5
	15-28	10-25	1.35-1.60	2-6	0.12-0.18	0.0-2.9	3.5-5.5	0.0-1.0	.15	.17	
	28-80	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	3.5-5.5	0.0-0.5	.10	.24	
BeA:											
Biltmore, occasionally flooded----------	0-8	1-8	1.20-1.65	2-6	0.10-0.15	0.0-2.9	5.1-7.8	0.0-2.0	.17	.20	5
	8-80	0-4	1.20-1.70	6-20	0.06-0.10	0.0-2.9	5.1-7.8	0.0-0.5	.05	.05	
BkB2:											
Braddock, moderately eroded	0-11	27-40	1.20-1.50	0.6-2	0.14-0.19	0.0-2.9	3.5-6.0	0.0-2.0	.20	.28	5
	11-57	35-55	1.20-1.50	0.6-2	0.12-0.17	3.0-5.9	3.5-5.5	0.0-1.0	.17	.20	
	57-80	18-35	1.20-1.50	0.6-6	0.06-0.12	0.0-2.9	3.5-5.5	0.0-1.0	.24	.32	
BkC2:											
Braddock, moderately eroded	0-11	27-40	1.20-1.50	0.6-2	0.14-0.19	0.0-2.9	3.5-6.0	0.0-2.0	.20	.28	5
	11-57	35-55	1.20-1.50	0.6-2	0.12-0.17	3.0-5.9	3.5-5.5	0.0-1.0	.17	.20	
	57-80	18-35	1.20-1.50	0.6-6	0.06-0.12	0.0-2.9	3.5-5.5	0.0-1.0	.24	.32	
BkD2:											
Braddock, moderately eroded	0-11	27-40	1.20-1.50	0.6-2	0.14-0.19	0.0-2.9	3.5-6.0	0.0-2.0	.20	.28	5
	11-57	35-55	1.20-1.50	0.6-2	0.12-0.17	3.0-5.9	3.5-5.5	0.0-1.0	.17	.20	
	57-80	18-35	1.20-1.50	0.6-6	0.06-0.12	0.0-2.9	3.5-5.5	0.0-1.0	.24	.32	
BnB:											
Braddock----------	0-9	27-40	1.20-1.50	0.6-2	0.14-0.19	0.0-2.9	3.5-5.5	0.5-1.0	.17	.20	5
	9-48	35-55	1.20-1.50	0.6-2	0.12-0.17	3.0-5.9	3.5-5.5	0.0-1.0	.17	.20	
	48-80	18-35	1.20-1.50	0.6-6	0.06-0.12	0.0-2.9	3.5-5.5	0.0-1.0	.24	.32	
Urban land.											
BnC:											
Braddock----------	0-11	27-40	1.20-1.50	0.6-2	0.14-0.19	0.0-2.9	3.5-5.5	0.5-1.0	.17	.20	5
	11-57	35-55	1.20-1.50	0.6-2	0.12-0.17	3.0-5.9	3.5-5.5	0.0-1.0	.17	.20	
	57-80	18-35	1.20-1.50	0.6-6	0.06-0.12	0.0-2.9	3.5-5.5	0.0-1.0	.24	.32	
Urban land.											
BpF:											
Breakneck, windswept--------	0-12	12-35	0.50-1.00	2-6	0.12-0.17	0.0-2.9	3.5-5.5	10-20	.02	.02	2
	12-28	10-27	1.00-1.50	2-6	0.10-0.18	0.0-2.9	3.5-5.5	3.0-8.0	.17	.32	
	28-80	---	---	---	0.00-0.00	---	---	---	---	---	
Pullback, windswept--------	0-8	18-35	0.50-1.00	2-6	0.12-0.17	0.0-2.9	3.5-5.5	10-20	.02	.02	1
	8-16	7-27	1.00-1.50	2-6	0.10-0.18	0.0-2.9	3.5-5.5	3.0-8.0	.20	.32	
	16-80	---	---	---	0.00-0.00	---	---	---	---	---	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
BwD:											
Burton, windswept-	0-17	20-35	1.10-1.30	2-6	0.16-0.23	0.0-2.9	3.5-6.0	10-20	.02	.02	2
	17-29	5-18	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.5-6.0	0.0-1.0	.28	.37	
	29-80	---	---	---	0.00-0.01	---	---	---	---	---	
Craggey, windswept	0-14	5-18	1.40-1.60	2-6	0.11-0.17	0.0-2.9	3.5-6.0	10-20	.02	.02	1
	14-80	---	---	---	0.00-0.01	---	---	---	---	---	
BxE:											
Burton, windswept-	0-17	20-35	1.10-1.30	2-6	0.16-0.23	0.0-2.9	3.5-6.0	10-20	.02	.02	2
	17-29	5-18	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.5-6.0	0.0-1.0	.28	.37	
	29-80	---	---	---	0.00-0.01	---	---	---	---	---	
Craggey, windswept	0-14	5-18	1.40-1.60	2-6	0.11-0.17	0.0-2.9	3.5-6.0	10-20	.02	.02	1
	14-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
BxF:											
Burton, windswept-	0-17	20-35	1.10-1.30	2-6	0.16-0.23	0.0-2.9	3.5-6.0	10-20	.02	.02	2
	17-29	5-18	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.5-6.0	0.0-1.0	.28	.37	
	29-80	---	---	---	0.00-0.01	---	---	---	---	---	
Craggey, windswept	0-14	5-18	1.40-1.60	2-6	0.11-0.17	0.0-2.9	3.5-6.0	10-20	.02	.02	1
	14-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
CaE:											
Cataska, very rocky------------	0-6	12-22	1.30-1.40	2-20	0.10-0.14	0.0-2.9	3.5-5.5	1.0-3.0	.10	.32	2
	6-16	12-22	1.30-1.45	2-20	0.04-0.09	0.0-2.9	3.5-5.5	0.5-2.0	.15	.43	
	16-28	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
	28-80	---	---	---	0.00-0.00	---	---	---	---	---	
Sylco, very rocky-	0-6	15-25	1.00-1.20	0.6-2	0.11-0.16	0.0-2.9	3.5-5.5	2.0-6.0	.10	.24	2
	6-30	10-35	1.20-1.50	2-6	0.10-0.16	0.0-2.9	4.5-5.5	0.0-1.0	.10	.43	
	30-80	---	---	---	0.00-0.00	---	---	---	---	---	
CdF:											
Cataska, very stony------------	0-4	5-27	1.40-1.60	2-6	0.10-0.16	0.0-2.9	3.5-5.5	2.0-6.0	.17	.32	2
	4-12	12-22	1.30-1.45	2-20	0.04-0.09	0.0-2.9	3.5-5.5	0.5-2.0	.15	.43	
	12-28	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
	28-80	---	---	---	0.00-0.00	---	---	---	---	---	
Sylco, very stony-	0-5	15-25	1.00-1.20	2-6	0.11-0.16	0.0-2.9	3.5-5.5	2.0-6.0	.10	.24	2
	5-23	10-27	1.20-1.50	2-6	0.10-0.16	0.0-2.9	4.5-5.5	0.0-1.0	.10	.37	
	23-80	---	---	---	0.00-0.00	---	---	---	---	---	
Rock outcrop.											
ChD:											
Cheoah, stony-----	0-12	10-25	1.35-1.60	2-6	0.15-0.24	0.0-2.9	3.5-5.5	6.0-14	.02	.02	4
	12-38	5-18	1.35-1.60	2-6	0.14-0.22	0.0-2.9	3.5-5.5	0.0-1.0	.43	.43	
	38-51	5-25	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.5-5.5	0.0-1.0	.43	.43	
	51-80	---	---	---	0.00-0.10	---	---	0.0-0.0	---	---	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
ChD:											
Jeffrey, stony----	0-8	10-25	1.35-1.60	2-6	0.15-0.24	0.0-2.9	3.5-5.5	6.0-14	.02	.02	2
	8-31	5-25	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.5-5.5	0.0-1.0	.37	.37	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
ChE:											
Cheoah, stony-----	0-12	10-25	1.35-1.60	2-6	0.15-0.24	0.0-2.9	3.5-5.5	6.0-14	.02	.02	4
	12-38	5-18	1.35-1.60	2-6	0.14-0.22	0.0-2.9	3.5-5.5	0.0-1.0	.43	.43	
	38-51	5-25	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.5-5.5	0.0-1.0	.43	.43	
	51-80	---	---	---	0.00-0.10	---	---	0.0-0.0	---	---	
Jeffrey, stony----	0-8	10-25	1.35-1.60	2-6	0.15-0.24	0.0-2.9	3.5-5.5	6.0-14	.02	.02	2
	8-31	5-25	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.5-5.5	0.0-1.0	.37	.37	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
ChF:											
Cheoah, stony-----	0-12	10-25	1.35-1.60	2-6	0.15-0.24	0.0-2.9	3.5-5.5	6.0-14	.02	.02	4
	12-38	5-18	1.35-1.60	2-6	0.14-0.22	0.0-2.9	3.5-5.5	0.0-1.0	.43	.43	
	38-51	5-25	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.5-5.5	0.0-1.0	.43	.43	
	51-80	---	---	---	0.00-0.10	---	---	0.0-0.0	---	---	
Jeffrey, stony----	0-8	10-25	1.35-1.60	2-6	0.15-0.24	0.0-2.9	3.5-5.5	6.0-14	.02	.02	2
	8-31	5-25	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.5-5.5	0.0-1.0	.37	.37	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
CkB2:											
Clifton, moderately eroded	0-8	27-40	1.25-1.35	0.6-2	0.15-0.20	0.0-2.9	4.5-6.5	0.0-2.0	.24	.28	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.17	.20	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.32	.37	
CkC2:											
Clifton, moderately eroded	0-8	27-40	1.25-1.35	0.6-2	0.15-0.20	0.0-2.9	4.5-6.5	0.0-2.0	.24	.28	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.17	.20	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.32	.37	
CkD2:											
Clifton, moderately eroded	0-8	27-40	1.25-1.35	0.6-2	0.15-0.20	0.0-2.9	4.5-6.5	0.0-2.0	.24	.28	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.17	.20	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.32	.37	
CkE2:											
Clifton, moderately eroded	0-8	27-40	1.25-1.35	0.6-2	0.15-0.20	0.0-2.9	4.5-6.5	0.0-2.0	.24	.28	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.17	.20	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.32	.37	
CsB:											
Clifton, stony----	0-8	10-27	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.10	.15	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.17	.20	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.32	.37	
CsC:											
Clifton, stony----	0-8	10-27	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.10	.15	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.17	.20	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.32	.37	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
CsD:											
Clifton, stony----	0-8	10-27	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.10	.15	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.17	.20	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.32	.37	
CuB:											
Clifton-----------	0-8	27-40	1.25-1.35	0.6-2	0.15-0.20	0.0-2.9	4.5-6.5	0.0-2.0	.24	.28	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.17	.20	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.32	.37	
Urban land.											
CuC:											
Clifton-----------	0-8	27-40	1.25-1.35	0.6-2	0.15-0.20	0.0-2.9	4.5-6.5	0.0-2.0	.24	.28	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.17	.20	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.32	.37	
Urban land.											
CuD:											
Clifton-----------	0-8	27-40	1.25-1.35	0.6-2	0.15-0.20	0.0-2.9	4.5-6.5	0.0-2.0	.24	.28	5
	8-55	35-55	1.20-1.60	0.6-2	0.15-0.20	3.0-5.9	4.5-6.5	0.0-1.0	.17	.20	
	55-80	5-27	1.20-1.35	2-6	0.11-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.32	.37	
Urban land.											
CxE:											
Craggey, windswept	0-14	5-18	1.40-1.60	2-6	0.11-0.17	0.0-2.9	3.5-6.0	10-20	.02	.02	1
	14-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
Clingman, windswept--------	0-14	5-18	0.15-0.40	2-6	0.45-0.65	0.0-2.9	---	20-90	---	---	1
	14-18	5-18	1.50-1.80	0.6-6	0.09-0.20	0.0-2.9	3.5-5.5	10-20	.10	.10	
	18-80	---	---	---	0.00-0.01	---	---	---	---	---	
CxF:											
Craggey, windswept	0-14	5-18	1.40-1.60	2-6	0.11-0.17	0.0-2.9	3.5-6.0	10-20	.02	.02	1
	14-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
Clingman, windswept--------	0-14	5-18	0.15-0.40	2-6	0.45-0.65	0.0-2.9	---	20-90	---	---	1
	14-18	5-18	1.50-1.80	0.6-6	0.09-0.20	0.0-2.9	3.5-5.5	10-20	.10	.10	
	18-80	---	---	---	0.00-0.01	---	---	---	---	---	
DAM.											
Dam											
DeA:											
Dellwood, occasionally flooded----------	0-8	5-15	1.30-1.50	2-6	0.08-0.12	0.0-2.9	4.5-7.3	4.0-8.0	.05	.10	3
	8-16	1-8	1.40-1.60	6-20	0.02-0.05	0.0-2.9	4.5-7.3	4.0-8.0	.02	.02	
	16-80	1-4	1.40-1.60	6-20	0.02-0.05	0.0-2.9	4.5-7.3	0.0-0.5	.02	.10	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
DeA:											
Reddies, occasionally flooded----------	0-14	5-18	1.30-1.50	2-6	0.10-0.18	0.0-2.9	4.5-7.3	4.0-8.0	.15	.17	3
	14-26	5-18	1.35-1.55	2-6	0.08-0.15	0.0-2.9	4.5-7.3	0.5-1.0	.20	.28	
	26-80	1-5	1.40-1.60	6-20	0.02-0.05	0.0-2.9	4.5-7.3	0.0-0.5	.02	.05	
DrB:											
Dillard, rarely flooded----------	0-7	10-25	1.20-1.50	0.6-2	0.15-0.20	0.0-2.9	5.1-6.0	4.0-8.0	.15	.17	5
	7-50	18-35	1.40-1.60	0.6-2	0.12-0.16	0.0-2.9	4.5-5.8	0.0-1.0	.28	.32	
	50-80	5-18	1.35-1.55	2-6	0.08-0.15	0.0-2.9	4.5-5.8	0.0-1.0	.24	.24	
EdC:											
Edneyville, stony-	0-5	5-18	1.40-1.60	2-6	0.11-0.17	0.0-2.9	3.5-6.0	2.0-6.0	.15	.20	5
	5-43	7-20	1.40-1.60	2-6	0.10-0.16	0.0-2.9	3.5-6.0	0.0-1.0	.17	.24	
	43-80	5-20	1.40-1.60	2-6	0.08-0.14	0.0-2.9	3.5-6.0	0.0-0.5	.17	.24	
Chestnut, stony---	0-10	5-20	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.5-6.0	2.0-6.0	.10	.17	3
	10-36	5-25	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.5-6.0	0.0-1.0	.15	.24	
	36-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
EdD:											
Edneyville, stony-	0-5	5-18	1.40-1.60	2-6	0.11-0.17	0.0-2.9	3.5-6.0	2.0-6.0	.15	.20	5
	5-43	7-20	1.40-1.60	2-6	0.10-0.16	0.0-2.9	3.5-6.0	0.0-1.0	.17	.24	
	43-80	5-20	1.40-1.60	2-6	0.08-0.14	0.0-2.9	3.5-6.0	0.0-0.5	.17	.24	
Chestnut, stony---	0-4	5-20	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.5-6.0	2.0-6.0	.10	.17	3
	4-36	5-25	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.5-6.0	0.0-1.0	.15	.24	
	36-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
EdE:											
Edneyville, stony-	0-5	5-18	1.40-1.60	2-6	0.11-0.17	0.0-2.9	3.5-6.0	2.0-6.0	.15	.20	5
	5-43	7-20	1.40-1.60	2-6	0.10-0.16	0.0-2.9	3.5-6.0	0.0-1.0	.17	.24	
	43-80	5-20	1.40-1.60	2-6	0.08-0.14	0.0-2.9	3.5-6.0	0.0-0.5	.17	.24	
Chestnut, stony---	0-4	5-20	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.5-6.0	2.0-6.0	.10	.17	3
	4-36	5-25	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.5-6.0	0.0-1.0	.15	.24	
	36-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
EdF:											
Edneyville, stony-	0-5	5-18	1.40-1.60	2-6	0.11-0.17	0.0-2.9	3.5-6.0	2.0-6.0	.15	.20	5
	5-43	7-20	1.40-1.60	2-6	0.10-0.16	0.0-2.9	3.5-6.0	0.0-1.0	.17	.24	
	43-80	5-20	1.40-1.60	2-6	0.08-0.14	0.0-2.9	3.5-6.0	0.0-0.5	.17	.24	
Chestnut, stony---	0-4	5-20	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.5-6.0	2.0-6.0	.10	.17	3
	4-36	5-25	1.35-1.60	2-6	0.08-0.12	0.0-2.9	3.5-6.0	0.0-1.0	.15	.24	
	36-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
EvD2:											
Evard, moderately eroded-----------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-2.0	.20	.24	5
	5-29	18-35	1.30-1.50	0.6-2	0.15-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.17	.20	
	29-37	12-20	1.20-1.40	0.6-2	0.08-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.20	.24	
	37-80	5-20	1.20-1.40	0.6-2	0.05-0.17	0.0-2.9	4.5-6.0	0.0-0.5	.20	.28	
Cowee, moderately eroded-----------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-2.0	.20	.24	3
	5-27	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.10	.20	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
EvE2:											
Evard, moderately eroded-----------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-2.0	.20	.24	5
	5-29	18-35	1.30-1.50	0.6-2	0.15-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.17	.20	
	29-37	12-20	1.20-1.40	0.6-2	0.08-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.20	.24	
	37-80	5-20	1.20-1.40	0.6-2	0.05-0.17	0.0-2.9	4.5-6.0	0.0-0.5	.20	.28	
Cowee, moderately eroded-----------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-2.0	.20	.24	3
	5-27	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.10	.20	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
EvF2:											
Evard, moderately eroded-----------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	2.0-6.0	.15	.17	5
	5-29	18-35	1.30-1.50	0.6-2	0.15-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.17	.20	
	29-37	12-20	1.20-1.40	0.6-2	0.08-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.20	.24	
	37-80	5-20	1.20-1.40	0.6-2	0.05-0.17	0.0-2.9	4.5-6.0	0.0-0.5	.20	.28	
Cowee, moderately eroded-----------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	2.0-6.0	.15	.17	3
	5-27	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.10	.20	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
EwC:											
Evard, stony------	0-5	10-25	1.30-1.60	2-6	0.10-0.14	0.0-2.9	4.5-6.0	2.0-6.0	.17	.24	5
	5-32	20-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-1.0	.24	.28	
	32-45	12-25	1.20-1.40	0.6-2	0.10-0.25	0.0-2.9	4.5-6.0	0.0-0.5	.28	.37	
	45-80	5-20	1.20-1.40	0.6-2	0.08-0.12	0.0-2.9	4.5-6.0	0.0-0.5	.17	.28	
Cowee, stony------	0-10	8-20	1.25-1.60	2-6	0.12-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.10	.15	3
	10-38	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.24	.32	
	38-80	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
EwD:											
Evard, stony------	0-5	10-25	1.30-1.60	2-6	0.10-0.14	0.0-2.9	4.5-6.0	2.0-6.0	.17	.24	5
	5-32	20-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-1.0	.24	.28	
	32-45	12-25	1.20-1.40	0.6-2	0.10-0.25	0.0-2.9	4.5-6.0	0.0-0.5	.28	.37	
	45-80	5-20	1.20-1.40	0.6-2	0.08-0.12	0.0-2.9	4.5-6.0	0.0-0.5	.17	.28	
Cowee, stony------	0-5	8-20	1.25-1.60	2-6	0.12-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.10	.15	3
	5-38	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.24	.32	
	38-80	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
EwE:											
Evard, stony------	0-5	10-25	1.30-1.60	2-6	0.10-0.14	0.0-2.9	4.5-6.0	2.0-6.0	.17	.24	5
	5-32	20-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-1.0	.24	.28	
	32-45	12-25	1.20-1.40	0.6-2	0.10-0.25	0.0-2.9	4.5-6.0	0.0-0.5	.28	.37	
	45-80	5-20	1.20-1.40	0.6-2	0.08-0.12	0.0-2.9	4.5-6.0	0.0-0.5	.17	.28	
Cowee, stony------	0-5	8-20	1.25-1.60	2-6	0.12-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.10	.15	3
	5-38	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.24	.32	
	38-80	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
EwF:											
Evard, stony------	0-5	10-25	1.30-1.60	2-6	0.10-0.14	0.0-2.9	4.5-6.0	2.0-6.0	.17	.24	5
	5-32	20-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-1.0	.24	.28	
	32-45	12-25	1.20-1.40	0.6-2	0.10-0.25	0.0-2.9	4.5-6.0	0.0-0.5	.28	.37	
	45-80	5-20	1.20-1.40	0.6-2	0.08-0.12	0.0-2.9	4.5-6.0	0.0-0.5	.17	.28	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
EwF:											
Cowee, stony------	0-5	8-20	1.25-1.60	2-6	0.12-0.20	0.0-2.9	4.5-6.0	1.0-5.0	.10	.15	3
	5-38	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	4.5-6.0	0.5-1.0	.20	.32	
	38-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
ExC:											
Evard-------------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-2.0	.20	.24	5
	5-29	18-35	1.30-1.50	0.6-2	0.15-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.17	.20	
	29-37	12-20	1.20-1.40	0.6-2	0.08-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.20	.24	
	37-80	5-20	1.20-1.40	0.6-2	0.05-0.17	0.0-2.9	4.5-6.0	0.0-0.5	.20	.28	
Cowee-------------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	2.0-6.0	.15	.17	3
	5-27	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.10	.20	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Urban land.											
ExD:											
Evard-------------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-2.0	.20	.24	5
	5-29	18-35	1.30-1.50	0.6-2	0.15-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.17	.20	
	29-37	12-20	1.20-1.40	0.6-2	0.08-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.20	.24	
	37-80	5-20	1.20-1.40	0.6-2	0.05-0.17	0.0-2.9	4.5-6.0	0.0-0.5	.20	.28	
Cowee-------------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	2.0-6.0	.15	.17	3
	5-27	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.10	.20	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Urban land.											
ExE:											
Evard-------------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	0.0-2.0	.20	.24	5
	5-29	18-35	1.30-1.50	0.6-2	0.15-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.17	.20	
	29-37	12-20	1.20-1.40	0.6-2	0.08-0.18	0.0-2.9	4.5-6.0	0.0-1.0	.20	.24	
	37-80	5-20	1.20-1.40	0.6-2	0.05-0.17	0.0-2.9	4.5-6.0	0.0-0.5	.20	.28	
Cowee-------------	0-5	25-35	1.30-1.50	0.6-2	0.12-0.16	0.0-2.9	4.5-6.0	2.0-6.0	.15	.17	3
	5-27	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.10	.20	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Urban land.											
FaC2:											
Fannin, moderately eroded-----------	0-7	18-35	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	5
	7-21	18-35	1.30-1.50	0.6-2	0.11-0.17	0.0-2.9	4.5-6.5	0.0-1.0	.32	.32	
	21-80	5-25	1.30-1.50	0.6-2	0.08-0.12	0.0-2.9	4.5-6.5	0.0-0.5	.32	.32	
Lauada, moderately eroded-----------	0-8	18-35	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	3
	8-34	18-35	1.20-1.40	0.6-2	0.11-0.17	0.0-2.9	4.5-6.0	0.0-1.0	.32	.32	
	34-80	---	---	---	0.00-0.10	---	4.5-6.0	0.0-0.0	---	---	
FaD2:											
Fannin, moderately eroded-----------	0-7	18-35	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	5
	7-21	18-35	1.30-1.50	0.6-2	0.11-0.17	0.0-2.9	4.5-6.5	0.0-1.0	.32	.32	
	21-80	5-25	1.30-1.50	0.6-2	0.08-0.12	0.0-2.9	4.5-6.5	0.0-0.5	.32	.32	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
FaD2:											
Lauada, moderately eroded-----------	0-8	18-35	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	3
	8-34	18-35	1.20-1.40	0.6-2	0.11-0.17	0.0-2.9	4.5-6.0	0.0-1.0	.32	.32	
	34-80	---	---	---	0.00-0.10	---	4.5-6.0	0.0-0.0	---	---	
FaE2:											
Fannin, moderately eroded-----------	0-7	18-35	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	5
	7-21	18-35	1.30-1.50	0.6-2	0.11-0.17	0.0-2.9	4.5-6.5	0.0-1.0	.32	.32	
	21-80	5-25	1.30-1.50	0.6-2	0.08-0.12	0.0-2.9	4.5-6.5	0.0-0.5	.32	.32	
Lauada, moderately eroded-----------	0-8	18-35	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	3
	8-34	18-35	1.20-1.40	0.6-2	0.11-0.17	0.0-2.9	4.5-6.0	0.0-1.0	.32	.32	
	34-80	---	---	---	0.00-0.10	---	4.5-6.0	0.0-0.0	---	---	
FnB:											
Fannin, moderately eroded-----------	0-7	18-35	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	5
	7-21	18-35	1.30-1.50	0.6-2	0.11-0.17	0.0-2.9	4.5-6.5	0.0-1.0	.32	.32	
	21-80	5-25	1.30-1.50	0.6-2	0.08-0.12	0.0-2.9	4.5-6.5	0.0-0.5	.32	.32	
Lauada, moderately eroded-----------	0-8	18-35	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	3
	8-34	18-35	1.20-1.40	0.6-2	0.11-0.17	0.0-2.9	4.5-6.0	0.0-1.0	.32	.32	
	34-80	---	---	---	0.00-0.10	---	4.5-6.0	0.0-0.0	---	---	
Urban land.											
FnC:											
Fannin, moderately eroded-----------	0-7	18-35	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	5
	7-21	18-35	1.30-1.50	0.6-2	0.11-0.17	0.0-2.9	4.5-6.5	0.0-1.0	.32	.32	
	21-80	5-25	1.30-1.50	0.6-2	0.08-0.12	0.0-2.9	4.5-6.5	0.0-0.5	.32	.32	
Lauada, moderately eroded-----------	0-8	18-35	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	3
	8-34	18-35	1.20-1.40	0.6-2	0.11-0.17	0.0-2.9	4.5-6.0	0.0-1.0	.32	.32	
	34-80	---	---	---	0.00-0.10	---	4.5-6.0	0.0-0.0	---	---	
Urban land.											
FnD:											
Fannin, moderately eroded-----------	0-7	18-35	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	5
	7-21	18-35	1.30-1.50	0.6-2	0.11-0.17	0.0-2.9	4.5-6.5	0.0-1.0	.32	.32	
	21-80	5-25	1.30-1.50	0.6-2	0.08-0.12	0.0-2.9	4.5-6.5	0.0-0.5	.32	.32	
Lauada, moderately eroded-----------	0-8	18-35	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	4.5-6.5	0.0-2.0	.28	.28	3
	8-34	18-35	1.20-1.40	0.6-2	0.11-0.17	0.0-2.9	4.5-6.0	0.0-1.0	.32	.32	
	34-80	---	---	---	0.00-0.10	---	4.5-6.0	0.0-0.0	---	---	
Urban land.											

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
FrA:											
French, occasionally flooded----------	0-12	8-27	1.40-1.60	0.6-2	0.15-0.20	0.0-2.9	5.1-6.5	4.0-8.0	.17	.20	3
	12-30	8-35	1.30-1.50	0.6-2	0.12-0.20	0.0-2.9	5.1-6.5	0.0-1.0	.28	.37	
	30-80	1-5	1.40-1.60	6-20	0.02-0.05	0.0-2.9	5.1-6.5	0.0-0.5	.02	.05	
HcE:											
Heintooga, very stony------------	0-12	10-35	0.50-1.00	2-6	0.08-0.16	0.0-2.9	3.4-5.5	10-20	.02	.02	3
	12-25	5-15	1.00-1.50	2-6	0.04-0.06	0.0-2.9	3.4-5.5	0.0-1.0	.05	.28	
	25-80	5-15	1.00-1.50	2-6	0.03-0.05	0.0-2.9	3.4-5.5	0.0-1.0	.02	.28	
Chiltoskie, very stony------------	0-8	18-30	0.66-1.30	2-6	0.17-0.22	0.0-2.9	3.5-5.5	10-20	.02	.02	5
	8-43	10-25	1.28-1.52	2-6	0.18-0.20	0.0-2.9	3.5-5.5	0.0-1.0	.32	.43	
	43-80	5-15	1.30-1.45	2-6	0.07-0.09	0.0-2.9	3.5-5.5	0.0-1.0	.10	.28	
HpA:											
Hemphill, rarely flooded----------	0-8	8-27	1.20-1.45	0.6-2	0.15-0.24	0.0-2.9	4.5-7.3	8.0-12	.10	.10	5
	8-32	35-60	1.20-1.45	0.06-0.2	0.15-0.20	0.0-2.9	4.5-7.3	0.0-1.0	.28	.28	
	32-80	8-35	1.20-1.45	0.2-0.6	0.12-0.20	0.0-2.9	4.5-7.3	0.0-1.0	.24	.28	
IoA:											
Iotla, occasionally flooded----------	0-10	12-18	1.45-1.65	2-6	0.10-0.15	0.0-2.9	5.1-7.3	4.0-8.0	.15	.20	5
	10-31	12-23	1.45-1.65	2-6	0.10-0.15	0.0-2.9	5.1-7.3	0.0-1.0	.28	.37	
	31-35	4-12	1.60-1.75	6-20	0.06-0.10	0.0-2.9	5.1-7.3	0.0-0.5	.15	.17	
	35-80	12-18	1.45-1.65	2-6	0.10-0.15	0.0-2.9	5.1-7.3	0.0-0.5	.32	.43	
JbB:											
Junaluska---------	0-5	5-18	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.5-6.0	2.0-6.0	.10	.20	3
	5-21	18-35	1.30-1.65	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.17	.20	
	21-36	15-20	1.35-1.65	2-6	0.10-0.15	0.0-2.9	3.5-6.0	0.0-0.5	.15	.28	
	36-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Brasstown---------	0-6	5-18	1.00-1.40	2-6	0.12-0.18	0.0-2.9	3.5-6.0	1.0-5.0	.24	.32	4
	6-36	18-35	1.35-1.60	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.28	.32	
	36-45	8-20	1.40-1.65	0.6-2	0.10-0.15	0.0-2.9	3.5-6.0	0.0-0.5	.37	.49	
	45-80	---	---	---	0.00-0.10	---	---	0.0-0.0	---	---	
JbC:											
Junaluska---------	0-5	5-18	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.5-6.0	2.0-6.0	.10	.20	3
	5-21	18-35	1.30-1.65	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.17	.20	
	21-36	15-20	1.35-1.65	2-6	0.10-0.15	0.0-2.9	3.5-6.0	0.0-0.5	.15	.28	
	36-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Brasstown---------	0-6	5-18	1.00-1.40	2-6	0.12-0.18	0.0-2.9	3.5-6.0	1.0-5.0	.24	.32	4
	6-36	18-35	1.35-1.60	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.28	.32	
	36-45	8-20	1.40-1.65	0.6-2	0.10-0.15	0.0-2.9	3.5-6.0	0.0-0.5	.37	.49	
	45-80	---	---	---	0.00-0.10	---	---	0.0-0.0	---	---	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
JbD:											
Junaluska---------	0-2	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	2.0-6.0	.20	.20	3
	2-11	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	1.0-3.0	.24	.28	
	11-21	18-35	1.30-1.65	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.20	.24	
	21-26	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-6.0	0.0-0.5	.32	.37	
	26-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Brasstown---------	0-6	5-18	1.00-1.40	2-6	0.12-0.18	0.0-2.9	3.5-6.0	2.0-6.0	.24	.28	4
	6-36	18-35	1.35-1.60	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.28	.32	
	36-45	8-20	1.40-1.65	0.6-2	0.10-0.15	0.0-2.9	3.5-6.0	0.0-0.5	.37	.49	
	45-80	---	---	---	0.00-0.10	---	---	0.0-0.0	---	---	
JbE:											
Junaluska---------	0-2	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	2.0-6.0	.20	.20	3
	2-11	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	1.0-3.0	.24	.28	
	11-21	18-35	1.30-1.65	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.20	.24	
	21-26	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-6.0	0.0-0.5	.32	.37	
	26-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Brasstown---------	0-6	5-18	1.00-1.40	2-6	0.12-0.18	0.0-2.9	3.5-6.0	2.0-6.0	.24	.28	4
	6-36	18-35	1.35-1.60	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.28	.32	
	36-45	8-20	1.40-1.65	0.6-2	0.10-0.15	0.0-2.9	3.5-6.0	0.0-0.5	.37	.49	
	45-80	---	---	---	0.00-0.10	---	---	0.0-0.0	---	---	
KsB:											
Kanuga------------	0-12	10-25	1.20-1.50	0.6-2	0.15-0.20	0.0-2.9	5.1-6.0	4.0-8.0	.20	.24	5
	12-58	35-60	1.35-1.45	0.2-0.6	0.12-0.16	3.0-5.9	4.5-5.5	0.0-1.0	.17	.20	
	58-91	18-35	1.40-1.60	0.2-0.6	0.14-0.18	0.0-2.9	4.0-5.5	0.0-0.5	.10	.24	
Swannanoa---------	0-15	27-35	1.20-1.40	0.6-2	0.13-0.18	0.0-2.9	4.5-7.3	4.0-8.0	.17	.20	5
	15-64	35-60	1.35-1.45	0.2-0.6	0.12-0.16	3.0-5.9	4.5-5.5	0.0-1.0	.17	.20	
	64-91	30-50	1.40-1.60	0.2-0.6	0.14-0.18	0.0-2.9	4.0-5.5	0.0-0.5	.15	.24	
KsC:											
Kanuga------------	0-12	10-25	1.20-1.50	0.6-2	0.15-0.20	0.0-2.9	5.1-6.0	4.0-8.0	.20	.24	5
	12-58	35-60	1.35-1.45	0.2-0.6	0.12-0.16	3.0-5.9	4.5-5.5	0.0-1.0	.17	.20	
	58-91	18-35	1.40-1.60	0.2-0.6	0.14-0.18	0.0-2.9	4.0-5.5	0.0-0.5	.10	.24	
Swannanoa---------	0-15	27-35	1.20-1.40	0.6-2	0.13-0.18	0.0-2.9	4.5-7.3	4.0-8.0	.17	.20	5
	15-64	35-60	1.35-1.45	0.2-0.6	0.12-0.16	3.0-5.9	4.5-5.5	0.0-1.0	.17	.20	
	64-91	30-50	1.40-1.60	0.2-0.6	0.14-0.18	0.0-2.9	4.0-5.5	0.0-0.5	.15	.24	
MvD:											
Mars Hill, stony--	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.15	4
	3-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.17	.24	
	9-35	5-20	1.35-1.65	2-6	0.10-0.19	0.0-2.9	5.1-7.3	0.0-1.0	.20	.28	
	35-46	5-20	1.40-1.80	2-6	0.08-0.16	0.0-2.9	5.1-7.3	0.0-0.5	.24	.28	
	46-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Walnut, stony-----	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.15	3
	2-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.17	.24	
	9-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.32	.43	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.15	.28	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
MvE:											
Mars Hill, stony--	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.15	4
	2-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.17	.24	
	9-35	5-20	1.35-1.65	2-6	0.10-0.19	0.0-2.9	5.1-7.3	0.0-1.0	.20	.28	
	35-46	5-20	1.40-1.80	2-6	0.08-0.16	0.0-2.9	5.1-7.3	0.0-0.5	.24	.28	
	46-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Walnut, stony-----	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.15	3
	3-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.17	.24	
	9-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.32	.43	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.15	.28	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
MvF:											
Mars Hill, stony--	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.15	4
	3-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.17	.24	
	9-35	5-20	1.35-1.65	2-6	0.10-0.19	0.0-2.9	5.1-7.3	0.0-1.0	.20	.28	
	35-46	5-20	1.40-1.80	2-6	0.08-0.16	0.0-2.9	5.1-7.3	0.0-0.5	.24	.28	
	46-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Walnut, stony-----	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.15	3
	2-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.17	.24	
	9-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.32	.43	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.15	.28	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
MwD:											
Micaville, stony--	0-3	5-20	1.00-1.40	2-6	0.10-0.16	0.0-2.9	3.5-5.5	2.0-6.0	.15	.24	4
	3-37	5-20	1.20-1.60	2-6	0.10-0.14	0.0-2.9	3.5-5.5	0.0-1.0	.20	.32	
	37-51	2-18	1.20-1.80	2-6	0.10-0.14	0.0-2.9	3.5-5.5	0.0-1.0	.28	.32	
	51-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Brownwood, stony--	0-5	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	2.0-6.0	.32	.32	3
	5-27	7-25	1.20-1.60	2-6	0.10-0.14	0.0-2.9	4.5-5.5	0.0-1.0	.37	.37	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
MwE:											
Micaville, stony--	0-3	5-20	1.00-1.40	2-6	0.10-0.16	0.0-2.9	3.5-5.5	2.0-6.0	.15	.24	4
	3-37	5-20	1.20-1.60	2-6	0.10-0.14	0.0-2.9	3.5-5.5	0.0-1.0	.20	.32	
	37-51	2-18	1.20-1.80	2-6	0.10-0.14	0.0-2.9	3.5-5.5	0.0-1.0	.28	.32	
	51-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Brownwood, stony--	0-5	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	2.0-6.0	.32	.32	3
	5-27	7-25	1.20-1.60	2-6	0.10-0.14	0.0-2.9	4.5-5.5	0.0-1.0	.37	.37	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
MwF:											
Micaville, stony--	0-3	5-20	1.00-1.40	2-6	0.10-0.16	0.0-2.9	3.5-5.5	2.0-6.0	.15	.24	4
	3-37	5-20	1.20-1.60	2-6	0.10-0.14	0.0-2.9	3.5-5.5	0.0-1.0	.20	.32	
	37-51	2-18	1.20-1.80	2-6	0.10-0.14	0.0-2.9	3.5-5.5	0.0-1.0	.28	.32	
	51-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Brownwood, stony--	0-5	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	2.0-6.0	.32	.32	3
	5-27	7-25	1.20-1.60	2-6	0.10-0.14	0.0-2.9	4.5-5.5	0.0-1.0	.37	.37	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
NkA:											
Nikwasi, frequently flooded----------	0-26	5-18	1.30-1.50	2-6	0.13-0.20	0.0-2.9	4.5-6.5	8.0-12	.02	.02	3
	26-80	1-5	1.40-1.60	6-20	0.02-0.05	0.0-2.9	4.5-6.5	0.0-0.5	.02	.10	
NtD:											
Northcove, very stony------------	0-3	5-18	1.30-1.50	2-6	0.06-0.11	0.0-2.9	3.5-6.0	2.0-6.0	.05	.24	5
	3-60	5-18	1.40-1.60	2-6	0.06-0.11	0.0-2.9	3.5-6.0	0.0-1.0	.05	.28	
	60-80	1-18	1.40-1.60	2-6	0.03-0.05	0.0-2.9	3.5-6.0	0.0-0.5	.05	.28	
Maymead, very stony------------	0-5	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.20	.24	5
	5-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.20	.37	
NtE:											
Northcove, very stony------------	0-3	5-18	1.30-1.50	2-6	0.06-0.11	0.0-2.9	3.5-6.0	2.0-6.0	.05	.24	5
	3-60	5-18	1.40-1.60	2-6	0.06-0.11	0.0-2.9	3.5-6.0	0.0-1.0	.05	.28	
	60-80	1-18	1.40-1.60	2-6	0.03-0.05	0.0-2.9	3.5-6.0	0.0-0.5	.05	.28	
Maymead, very stony------------	0-5	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-6.0	.20	.24	5
	5-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.20	.37	
OwC:											
Oconaluftee, windswept--------	0-12	20-35	1.00-1.30	2-6	0.13-0.18	0.0-2.9	3.5-5.5	10-20	.02	.02	5
	12-44	5-18	1.20-1.50	2-6	0.11-0.17	0.0-2.9	3.5-6.0	0.0-1.0	.20	.43	
	44-80	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.5-6.0	0.0-0.5	.20	.32	
Guyot, windswept--	0-11	10-35	0.54-0.99	0.6-2	0.19-0.21	0.0-2.9	3.5-3.8	10-20	.02	.02	4
	11-28	7-27	1.50-1.55	2-6	0.17-0.19	0.0-2.9	4.3-4.8	0.0-1.0	.20	.24	
	28-54	5-15	1.40-1.51	2-6	0.07-0.10	0.0-2.9	4.9-5.0	0.0-0.5	.28	.32	
	54-80	---	---	---	0.00-0.00	---	---	0.0-0.0	---	---	
Cataloochee, windswept--------	0-9	18-35	---	0.6-2	0.19-0.21	0.0-2.9	3.3-3.4	10-20	.02	.02	2
	9-19	15-25	1.33-1.42	2-6	0.17-0.19	0.0-2.9	4.1-4.5	0.0-1.0	.20	.32	
	19-31	5-18	---	2-6	0.07-0.10	0.0-2.9	4.5-5.5	0.0-0.5	.20	.37	
	31-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
OwD:											
Oconaluftee, windswept--------	0-12	20-35	1.00-1.30	2-6	0.13-0.18	0.0-2.9	3.5-5.5	10-20	.02	.02	5
	12-44	5-18	1.20-1.50	2-6	0.11-0.17	0.0-2.9	3.5-6.0	0.0-1.0	.20	.43	
	44-80	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.5-6.0	0.0-0.5	.20	.32	
Guyot, windswept--	0-11	10-35	0.54-0.99	0.6-2	0.19-0.21	0.0-2.9	3.5-3.8	10-20	.02	.02	4
	11-28	7-27	1.50-1.55	2-6	0.17-0.19	0.0-2.9	4.3-4.8	0.0-1.0	.20	.24	
	28-54	5-15	1.40-1.51	2-6	0.07-0.10	0.0-2.9	4.9-5.0	0.0-0.5	.28	.32	
	54-80	---	---	---	0.00-0.00	---	---	0.0-0.0	---	---	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
OwD:											
Cataloochee, windswept--------	0-9	18-35	---	0.6-2	0.19-0.21	0.0-2.9	3.3-3.4	10-20	.02	.02	2
	9-19	15-25	1.33-1.42	2-6	0.17-0.19	0.0-2.9	4.1-4.5	0.0-1.0	.20	.32	
	19-31	5-18	---	2-6	0.07-0.10	0.0-2.9	4.5-5.5	0.0-0.5	.20	.37	
	31-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
OwE:											
Oconaluftee, windswept--------	0-12	20-35	1.00-1.30	2-6	0.13-0.18	0.0-2.9	3.5-5.5	10-20	.02	.02	5
	12-44	5-18	1.20-1.50	2-6	0.11-0.17	0.0-2.9	3.5-6.0	0.0-1.0	.20	.43	
	44-80	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.5-6.0	0.0-0.5	.20	.32	
Guyot, windswept--	0-11	10-35	0.54-0.99	0.6-2	0.19-0.21	0.0-2.9	3.5-3.8	10-20	.02	.02	4
	11-28	7-27	1.50-1.55	2-6	0.17-0.19	0.0-2.9	4.3-4.8	0.0-1.0	.20	.24	
	28-54	5-15	1.40-1.51	2-6	0.07-0.10	0.0-2.9	4.9-5.0	0.0-0.5	.28	.32	
	54-80	---	---	---	0.00-0.00	---	---	0.0-0.0	---	---	
Cataloochee, windswept--------	0-9	18-35	---	0.6-2	0.19-0.21	0.0-2.9	3.3-3.4	10-20	.02	.02	2
	9-19	15-25	1.33-1.42	2-6	0.17-0.19	0.0-2.9	4.1-4.5	0.0-1.0	.20	.32	
	19-31	5-18	---	2-6	0.07-0.10	0.0-2.9	4.5-5.5	0.0-0.5	.20	.37	
	31-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
OwF:											
Oconaluftee, windswept--------	0-12	20-35	1.00-1.30	2-6	0.13-0.18	0.0-2.9	3.5-5.5	10-20	.02	.02	5
	12-44	5-18	1.20-1.50	2-6	0.11-0.17	0.0-2.9	3.5-6.0	0.0-1.0	.20	.43	
	44-80	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.5-6.0	0.0-0.5	.20	.32	
Guyot, windswept--	0-11	10-35	0.54-0.99	0.6-2	0.19-0.21	0.0-2.9	3.5-3.8	10-20	.02	.02	4
	11-28	7-27	1.50-1.55	2-6	0.17-0.19	0.0-2.9	4.3-4.8	0.0-1.0	.20	.24	
	28-54	5-15	1.40-1.51	2-6	0.07-0.10	0.0-2.9	4.9-5.0	0.0-0.5	.28	.32	
	54-80	---	---	---	0.00-0.00	---	---	0.0-0.0	---	---	
Cataloochee, windswept--------	0-9	18-35	---	0.6-2	0.19-0.21	0.0-2.9	3.3-3.4	10-20	.02	.02	2
	9-19	15-25	1.33-1.42	2-6	0.17-0.19	0.0-2.9	4.1-4.5	0.0-1.0	.20	.32	
	19-31	5-18	---	2-6	0.07-0.10	0.0-2.9	4.5-5.5	0.0-0.5	.20	.37	
	31-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Pg.											
Pits, gravel											
Pt.											
Pits, quarry											
PwC:											
Porters, stony----	0-9	10-22	1.40-1.60	2-6	0.16-0.20	0.0-2.9	4.5-6.5	6.0-14	.05	.05	3
	9-54	7-25	1.40-1.60	2-6	0.10-0.20	0.0-2.9	4.5-6.5	0.0-1.0	.24	.37	
	54-80	---	---	---	0.00-0.01	---	---	---	---	---	
Unaka, stony------	0-9	10-22	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	6.0-14	.05	.05	2
	9-27	7-25	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.28	.43	
	27-31	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
PwD:											
Porters, stony----	0-9	10-22	1.40-1.60	2-6	0.16-0.20	0.0-2.9	4.5-6.5	6.0-14	.05	.05	3
	9-54	7-25	1.40-1.60	2-6	0.10-0.20	0.0-2.9	4.5-6.5	0.0-1.0	.24	.37	
	54-80	---	---	---	0.00-0.01	---	---	---	---	---	
Unaka, stony------	0-9	10-22	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	6.0-14	.05	.05	2
	9-27	7-25	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.28	.43	
	27-31	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
PwE:											
Porters, stony----	0-9	10-22	1.40-1.60	2-6	0.16-0.20	0.0-2.9	4.5-6.5	6.0-14	.05	.05	3
	9-54	7-25	1.40-1.60	2-6	0.10-0.20	0.0-2.9	4.5-6.5	0.0-1.0	.24	.37	
	54-80	---	---	---	0.00-0.01	---	---	---	---	---	
Unaka, stony------	0-9	10-22	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	6.0-14	.05	.05	2
	9-27	7-25	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.28	.43	
	27-31	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
PxF:											
Porters, rocky----	0-9	10-22	1.40-1.60	2-6	0.16-0.20	0.0-2.9	4.5-6.5	6.0-14	.05	.05	3
	9-54	7-25	1.40-1.60	2-6	0.10-0.20	0.0-2.9	4.5-6.5	0.0-1.0	.24	.37	
	54-80	---	---	---	0.00-0.01	---	---	---	---	---	
Unaka, rocky------	0-9	10-22	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	6.0-14	.05	.05	2
	9-27	7-25	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.28	.43	
	27-31	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
RdA:											
Reddies, occasionally flooded----------	0-14	5-18	1.30-1.50	2-6	0.10-0.18	0.0-2.9	4.5-7.3	4.0-8.0	.15	.17	3
	14-26	5-18	1.35-1.55	2-6	0.08-0.15	0.0-2.9	4.5-7.3	0.5-1.0	.20	.28	
	26-80	1-5	1.40-1.60	6-20	0.02-0.05	0.0-2.9	4.5-7.3	0.0-0.5	.02	.05	
RkF:											
Rock outcrop.											
Cleveland, very bouldery---------	0-5	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	2.0-6.0	.20	.24	1
	5-14	6-20	1.20-1.50	2-6	0.08-0.12	0.0-2.9	4.5-6.0	0.0-1.0	.24	.32	
	14-80	---	---	---	0.00-0.01	---	---	---	---	---	
RoF:											
Rock outcrop.											
Oteen, very bouldery---------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.17	2
	2-11	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.20	.28	
	11-15	5-20	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.10	.28	
	15-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
RsA:											
Rosman, occasionally flooded----------	0-10	8-18	1.25-1.40	2-6	0.12-0.18	0.0-2.9	5.1-6.5	4.0-8.0	.10	.10	5
	10-59	4-18	1.25-1.50	2-6	0.10-0.18	0.0-2.9	5.1-6.5	0.0-1.0	.28	.32	
	59-80	4-18	1.25-1.50	2-6	0.10-0.18	0.0-2.9	5.1-6.5	0.0-1.0	.28	.32	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
SoD:											
Soco, stony-------	0-2	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	2.0-6.0	.24	.24	3
	2-33	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	0.0-1.0	.32	.32	
	33-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Stecoah, stony----	0-5	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	2.0-6.0	.24	.24	4
	5-47	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	0.0-1.0	.32	.32	
	47-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
SoE:											
Soco, stony-------	0-2	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	2.0-6.0	.24	.24	3
	2-33	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	0.0-1.0	.32	.32	
	33-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Stecoah, stony----	0-5	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	2.0-6.0	.24	.24	4
	5-47	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	0.0-1.0	.32	.32	
	47-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
SoF:											
Soco, stony-------	0-2	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	2.0-6.0	.24	.24	3
	2-33	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	0.0-1.0	.32	.32	
	33-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Stecoah, stony----	0-5	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	2.0-6.0	.24	.24	4
	5-47	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	0.0-1.0	.32	.32	
	47-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
StB:											
Statler, rarely flooded----------	0-10	10-27	1.35-1.45	0.6-2	0.18-0.22	0.0-2.9	5.1-7.3	4.0-10	.10	.10	5
	10-50	18-35	1.35-1.50	0.6-2	0.17-0.20	0.0-2.9	5.1-6.5	0.0-1.0	.24	.32	
	50-80	15-35	1.35-1.50	0.6-2	0.17-0.20	0.0-2.9	5.1-6.0	0.0-0.5	.17	.24	
SyD:											
Sylco, stony------	0-5	5-18	1.35-1.60	2-6	0.12-0.18	0.0-2.9	3.5-5.5	2.0-6.0	.15	.24	2
	5-23	10-25	1.30-1.50	2-6	0.10-0.15	0.0-2.9	3.5-5.5	0.0-1.0	.10	.37	
	23-80	---	---	---	0.00-0.00	---	---	---	---	---	
Soco, stony-------	0-5	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.5-5.5	2.0-6.0	.10	.15	3
	5-24	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	0.0-1.0	.28	.32	
	24-35	5-18	1.40-1.65	2-6	0.09-0.15	0.0-2.9	3.5-5.5	0.0-0.5	.20	.37	
	35-80	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
SyE:											
Sylco, stony------	0-5	5-18	1.35-1.60	2-6	0.12-0.18	0.0-2.9	3.5-5.5	2.0-6.0	.15	.24	2
	5-23	10-25	1.30-1.50	2-6	0.10-0.15	0.0-2.9	3.5-5.5	0.0-1.0	.10	.37	
	23-80	---	---	---	0.00-0.00	---	---	---	---	---	
Soco, stony-------	0-5	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.5-5.5	2.0-6.0	.10	.15	3
	5-24	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	0.0-1.0	.28	.32	
	24-35	5-18	1.40-1.65	2-6	0.09-0.15	0.0-2.9	3.5-5.5	0.0-1.0	.17	.37	
	35-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
SzF:											
Sylco, very stony-	0-5	5-18	1.35-1.60	2-6	0.12-0.18	0.0-2.9	3.5-5.5	2.0-6.0	.15	.24	2
	5-23	10-25	1.30-1.50	2-6	0.10-0.15	0.0-2.9	3.5-5.5	0.0-1.0	.10	.37	
	23-80	---	---	---	0.00-0.00	---	---	---	---	---	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
SzF:											
Soco, very stony--	0-5	5-18	1.35-1.60	2-6	0.11-0.17	0.0-2.9	3.5-5.5	2.0-6.0	.10	.15	3
	5-24	5-18	1.35-1.60	2-6	0.12-0.20	0.0-2.9	3.5-5.5	0.0-1.0	.28	.32	
	24-35	5-18	1.40-1.65	2-6	0.09-0.15	0.0-2.9	3.5-5.5	0.0-1.0	.17	.37	
	35-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
TaB:											
Tate--------------	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-8.0	.17	.20	5
	7-46	20-35	1.30-1.45	0.6-2	0.17-0.19	0.0-2.9	4.5-6.5	0.0-1.0	.28	.32	
	46-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-6.5	0.0-1.0	.20	.37	
TaC:											
Tate--------------	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-8.0	.17	.20	5
	7-46	20-35	1.30-1.45	0.6-2	0.17-0.19	0.0-2.9	4.5-6.5	0.0-1.0	.28	.32	
	46-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-6.5	0.0-1.0	.20	.37	
TaD:											
Tate--------------	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-8.0	.17	.20	5
	7-46	20-35	1.30-1.45	0.6-2	0.17-0.19	0.0-2.9	4.5-6.5	0.0-1.0	.28	.32	
	46-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-6.5	0.0-1.0	.20	.37	
TkC:											
Tate, very stony--	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-8.0	.20	.24	5
	7-46	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.10	.20	
	46-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-6.5	0.0-1.0	.20	.37	
TkD:											
Tate, very stony--	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-8.0	.20	.24	5
	7-46	18-35	1.30-1.60	0.6-2	0.12-0.18	0.0-2.9	3.5-6.0	0.0-1.0	.10	.20	
	46-80	7-27	1.40-1.55	2-6	0.13-0.18	0.0-2.9	4.5-6.5	0.0-1.0	.20	.37	
TmB:											
Tate--------------	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-8.0	.20	.24	5
	7-46	20-35	1.30-1.45	0.6-2	0.17-0.19	0.0-2.9	4.5-6.5	0.0-1.0	.28	.32	
	46-80	5-20	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.20	.24	
Urban land.											
TmC:											
Tate--------------	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-8.0	.20	.24	5
	7-46	20-35	1.30-1.45	0.6-2	0.17-0.19	0.0-2.9	4.5-6.5	0.0-1.0	.28	.32	
	46-80	5-20	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.20	.24	
Urban land.											
TmD:											
Tate--------------	0-7	5-25	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	2.0-8.0	.20	.24	5
	7-46	20-35	1.30-1.45	0.6-2	0.17-0.19	0.0-2.9	4.5-6.5	0.0-1.0	.28	.32	
	46-80	5-20	1.35-1.60	2-6	0.12-0.15	0.0-2.9	4.5-6.5	0.0-0.5	.20	.24	
Urban land.											
TnE:											
Toecane, extremely bouldery---------	0-8	5-25	1.30-1.50	2-6	0.10-0.14	0.0-2.9	3.5-6.0	5.0-15	.02	.02	5
	8-24	10-30	1.40-1.60	2-6	0.08-0.12	0.0-2.9	3.5-6.0	0.0-1.0	.05	.20	
	24-30	5-20	1.40-1.60	2-6	0.06-0.10	0.0-2.9	3.5-6.0	0.0-1.0	.05	.24	
	30-80	5-20	1.45-1.65	2-6	0.04-0.08	0.0-2.9	3.5-6.0	0.0-0.5	.02	.10	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
ToC:											
Toecane, bouldery-	0-8	10-22	1.30-1.50	2-6	0.10-0.14	0.0-2.9	3.5-6.0	5.0-15	.02	.02	5
	8-24	10-25	1.40-1.60	2-6	0.08-0.12	0.0-2.9	3.5-6.0	0.0-1.0	.15	.37	
	24-30	5-20	1.40-1.60	2-6	0.06-0.10	0.0-2.9	3.5-6.0	0.0-1.0	.10	.24	
	30-80	5-20	1.45-1.65	2-6	0.04-0.08	0.0-2.9	3.5-6.0	0.0-0.5	.02	.10	
Tusquitee, bouldery---------	0-9	10-22	1.20-1.40	2-6	0.16-0.24	0.0-2.9	4.5-6.5	5.0-15	.02	.02	5
	9-88	7-25	1.30-1.60	2-6	0.15-0.21	0.0-2.9	4.5-6.0	0.5-1.0	.17	.24	
TpD:											
Toecane, very bouldery---------	0-8	10-22	1.30-1.50	2-6	0.10-0.14	0.0-2.9	3.5-6.0	5.0-15	.02	.02	5
	8-24	10-25	1.40-1.60	2-6	0.08-0.12	0.0-2.9	3.5-6.0	0.0-1.0	.15	.37	
	24-30	5-20	1.40-1.60	2-6	0.06-0.10	0.0-2.9	3.5-6.0	0.0-1.0	.10	.24	
	30-80	5-20	1.45-1.65	2-6	0.04-0.08	0.0-2.9	3.5-6.0	0.0-0.5	.02	.10	
Tusquitee, very bouldery---------	0-8	5-20	1.20-1.40	2-6	0.12-0.17	0.0-2.9	4.5-6.5	5.0-15	.02	.02	5
	8-48	7-20	1.30-1.60	2-6	0.11-0.21	0.0-2.9	4.5-6.0	0.0-1.0	.32	.43	
	48-80	5-20	1.30-1.60	2-6	0.08-0.14	0.0-2.9	4.5-6.0	0.0-0.5	.15	.28	
TpE:											
Toecane, very bouldery---------	0-8	10-22	1.30-1.50	2-6	0.10-0.14	0.0-2.9	3.5-6.0	5.0-15	.02	.02	5
	8-24	10-25	1.40-1.60	2-6	0.08-0.12	0.0-2.9	3.5-6.0	0.0-1.0	.15	.37	
	24-30	5-20	1.40-1.60	2-6	0.06-0.10	0.0-2.9	3.5-6.0	0.0-1.0	.10	.24	
	30-80	5-20	1.45-1.65	2-6	0.04-0.08	0.0-2.9	3.5-6.0	0.0-0.5	.02	.10	
Tusquitee, very bouldery---------	0-8	5-20	1.20-1.40	2-6	0.12-0.17	0.0-2.9	4.5-6.5	5.0-15	.02	.02	5
	8-48	7-20	1.30-1.60	2-6	0.11-0.21	0.0-2.9	4.5-6.0	0.0-1.0	.32	.43	
	48-80	5-20	1.30-1.60	2-6	0.08-0.14	0.0-2.9	4.5-6.0	0.0-0.5	.15	.28	
TsA:											
Toxaway, frequently flooded----------	0-26	7-27	1.30-1.50	0.6-2	0.15-0.20	0.0-2.9	5.1-6.5	8.0-18	.02	.02	5
	26-80	5-30	1.45-1.65	2-20	0.05-0.15	0.0-2.9	5.1-6.5	0.5-2.0	.10	.15	
TtE:											
Trimont, stony----	0-9	8-20	1.35-1.60	2-6	0.10-0.15	0.0-2.9	4.5-6.0	3.0-9.0	.10	.20	5
	9-45	18-35	1.30-1.50	0.6-2	0.12-0.20	0.0-2.9	4.5-6.0	0.5-2.0	.17	.20	
	45-80	8-20	1.40-1.65	0.6-2	0.10-0.15	0.0-2.9	4.5-6.0	0.0-0.5	.20	.28	
TuD:											
Tusquitee, stony--	0-8	5-20	1.20-1.40	2-6	0.12-0.17	0.0-2.9	4.5-6.5	5.0-15	.02	.02	5
	8-48	7-20	1.30-1.60	2-6	0.11-0.21	0.0-2.9	4.5-6.0	0.0-1.0	.32	.43	
	48-80	5-20	1.30-1.60	2-6	0.08-0.14	0.0-2.9	4.5-6.0	0.0-0.5	.15	.28	
Toecane, stony----	0-8	7-25	1.30-1.50	2-6	0.10-0.14	0.0-2.9	3.5-6.0	5.0-15	.02	.02	5
	8-24	10-30	1.40-1.60	2-6	0.08-0.12	0.0-2.9	3.5-6.0	0.0-1.0	.05	.20	
	24-30	5-20	1.40-1.60	2-6	0.06-0.10	0.0-2.9	3.5-6.0	0.0-1.0	.05	.24	
	30-80	5-20	1.45-1.65	2-6	0.04-0.08	0.0-2.9	3.5-6.0	0.0-0.5	.02	.10	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
TwB:											
Tusquitee---------	0-8	10-25	1.30-1.60	2-6	0.10-0.14	0.0-2.9	4.5-6.0	4.0-10	.15	.20	5
	8-48	7-20	1.30-1.60	2-6	0.11-0.21	0.0-2.9	4.5-6.0	0.0-1.0	.32	.43	
	48-80	5-20	1.30-1.60	2-6	0.08-0.14	0.0-2.9	4.5-6.0	0.0-0.5	.15	.28	
Whiteside---------	0-11	5-18	1.30-1.50	2-6	0.15-0.22	0.0-2.9	4.5-7.3	4.0-8.0	.15	.20	5
	11-37	18-27	1.35-1.55	0.6-2	0.14-0.20	0.0-2.9	4.5-6.0	0.0-1.0	.28	.37	
	37-80	8-35	1.35-1.60	0.6-6	0.10-0.16	0.0-2.9	4.5-6.0	0.0-0.5	.17	.24	
TwC:											
Tusquitee---------	0-8	10-25	1.30-1.60	2-6	0.10-0.14	0.0-2.9	4.5-6.0	4.0-10	.15	.20	5
	8-48	7-20	1.30-1.60	2-6	0.11-0.21	0.0-2.9	4.5-6.0	0.0-1.0	.32	.43	
	48-80	5-20	1.30-1.60	2-6	0.08-0.14	0.0-2.9	4.5-6.0	0.0-0.5	.15	.28	
Whiteside---------	0-11	5-18	1.30-1.50	2-6	0.15-0.22	0.0-2.9	4.5-7.3	4.0-8.0	.15	.20	5
	11-37	18-27	1.35-1.55	0.6-2	0.14-0.20	0.0-2.9	4.5-6.0	0.0-1.0	.28	.37	
	37-80	8-35	1.35-1.60	0.6-6	0.10-0.16	0.0-2.9	4.5-6.0	0.0-0.5	.17	.24	
UcB:											
Udifluvents, frequently flooded----------	0-80	0-4	1.20-1.70	6-20	0.06-0.10	0.0-2.9	5.1-7.8	0.0-0.5	.02	.02	5
Ud:											
Udorthents, loamy-	0-80	4-40	1.30-1.80	0.00-20	0.10-0.17	0.0-2.9	4.5-7.8	0.0-0.5	.24	.28	5
UfB:											
Udorthents, occasionally flooded----------	0-80	4-20	1.30-1.65	0.00-20	0.10-0.17	0.0-2.9	4.5-7.8	0.0-0.5	.28	.28	5
Urban land, occasionally flooded.											
UhE:											
Udorthents, rocky-	0-80	4-20	1.30-1.65	0.00-20	0.10-0.17	0.0-2.9	4.5-7.8	0.0-0.5	.28	.28	5
Urban land.											
UkD:											
Unaka, very bouldery---------	0-9	10-22	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	6.0-14	.05	.05	2
	9-27	7-25	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.28	.43	
	27-31	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
UkE:											
Unaka, very bouldery---------	0-9	10-22	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	6.0-14	.05	.05	2
	9-27	7-25	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.28	.43	
	27-31	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
UkF:											
Unaka, very bouldery---------	0-9	10-22	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	6.0-14	.05	.05	2
	9-27	7-25	1.35-1.50	2-6	0.14-0.18	0.0-2.9	4.5-5.5	0.0-1.0	.28	.43	
	27-31	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	31-80	---	---	---	0.00-0.01	---	---	---	---	---	
Rock outcrop.											
UnB:											
Unison------------	0-10	10-25	1.35-1.65	0.6-6	0.14-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.17	.24	4
	10-49	30-70	1.30-1.60	0.6-2	0.12-0.18	3.0-5.9	4.5-6.0	0.0-1.0	.15	.17	
	49-80	18-35	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.10	.28	
UnC:											
Unison------------	0-10	10-25	1.35-1.65	0.6-6	0.14-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.17	.24	4
	10-49	30-70	1.30-1.60	0.6-2	0.12-0.18	3.0-5.9	4.5-6.0	0.0-1.0	.15	.17	
	49-80	18-35	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.10	.28	
UnD:											
Unison------------	0-10	10-25	1.35-1.65	0.6-6	0.14-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.17	.24	4
	10-49	30-70	1.30-1.60	0.6-2	0.12-0.18	3.0-5.9	4.5-6.0	0.0-1.0	.15	.17	
	49-80	18-35	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.10	.28	
UrB:											
Unison------------	0-10	10-25	1.35-1.65	0.6-6	0.14-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.17	.24	4
	10-88	30-70	1.30-1.60	0.6-2	0.12-0.18	3.0-5.9	4.5-6.0	0.0-1.0	.15	.17	
Urban land.											
UrC:											
Unison------------	0-10	10-25	1.35-1.65	0.6-6	0.14-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.17	.24	4
	10-88	30-70	1.30-1.60	0.6-2	0.12-0.18	3.0-5.9	4.5-6.0	0.0-1.0	.15	.17	
Urban land.											
Ux.											
Urban land											
W.											
Water											
WaC2:											
Walnut, moderately eroded-----------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.15	3
	2-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.32	.43	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.15	.28	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Oteen, moderately eroded-----------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.17	2
	2-11	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.20	.28	
	11-15	5-20	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.10	.28	
	15-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Mars Hill, moderately eroded	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.15	4
	3-35	5-20	1.35-1.65	2-6	0.10-0.19	0.0-2.9	5.1-7.3	0.0-1.0	.20	.28	
	35-46	5-20	1.40-1.80	2-6	0.08-0.16	0.0-2.9	5.1-7.3	0.0-0.5	.20	.28	
	46-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
WaD2:											
Walnut, moderately eroded-----------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.15	3
	2-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.32	.43	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.15	.28	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Oteen, moderately eroded-----------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.17	2
	2-11	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.20	.28	
	11-15	5-20	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.20	.28	
	15-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Mars Hill, moderately eroded	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.15	4
	3-35	5-20	1.35-1.65	2-6	0.10-0.19	0.0-2.9	5.1-7.3	0.0-1.0	.20	.28	
	35-46	5-20	1.40-1.80	2-6	0.08-0.16	0.0-2.9	5.1-7.3	0.0-0.5	.20	.28	
	46-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
WaE2:											
Walnut, moderately eroded-----------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.15	3
	2-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.20	.28	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.20	.28	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Oteen, moderately eroded-----------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.17	2
	2-11	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.20	.28	
	11-15	5-20	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.10	.28	
	15-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Mars Hill, moderately eroded	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.15	.15	4
	3-35	5-20	1.35-1.65	2-6	0.10-0.19	0.0-2.9	5.1-7.3	0.0-1.0	.20	.28	
	35-46	5-20	1.40-1.80	2-6	0.08-0.16	0.0-2.9	5.1-7.3	0.0-0.5	.20	.28	
	46-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
WnF:											
Walnut------------	0-3	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	3
	3-9	5-20	1.35-1.60	2-6	0.13-0.20	0.0-2.9	4.5-7.3	0.0-0.5	.24	.24	
	9-21	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	21-27	5-20	1.40-1.80	2-6	0.08-0.12	0.0-2.9	5.1-7.3	0.0-1.0	.15	.24	
	27-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Oteen-------------	0-2	5-20	1.00-1.40	2-6	0.12-0.15	0.0-2.9	4.5-5.5	1.0-8.0	.32	.32	2
	2-11	5-20	1.35-1.60	2-6	0.10-0.16	0.0-2.9	5.1-7.3	0.0-1.0	.24	.24	
	11-15	5-20	1.40-1.80	2-6	0.07-0.12	0.0-2.9	5.1-7.3	0.0-0.5	.17	.24	
	15-80	---	---	---	0.00-0.01	---	---	0.0-0.0	---	---	
Rock outcrop.											
WoE:											
Wayah, bouldery---	0-14	10-25	1.00-1.20	2-6	0.16-0.22	0.0-2.9	3.5-5.5	10-20	.02	.02	5
	14-48	10-25	1.20-1.60	2-6	0.09-0.13	0.0-2.9	3.5-6.0	0.0-1.0	.15	.20	
	48-80	3-15	1.40-1.65	2-6	0.05-0.09	0.0-2.9	3.5-6.0	0.0-0.5	.10	.28	
Burton, bouldery--	0-11	10-22	1.10-1.30	2-6	0.11-0.16	0.0-2.9	3.5-6.0	10-20	.02	.02	2
	11-25	10-25	1.45-1.65	2-6	0.07-0.12	0.0-2.9	3.5-6.0	0.0-1.0	.15	.28	
	25-80	---	---	---	0.00-0.01	---	---	---	---	---	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Soil reaction	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
WpF:											
Wayah, very rocky-	0-14	10-25	1.00-1.20	2-6	0.16-0.22	0.0-2.9	3.5-5.5	10-20	.02	.02	5
	14-48	10-25	1.20-1.60	2-6	0.09-0.13	0.0-2.9	3.5-6.0	0.0-1.0	.15	.20	
	48-80	3-15	1.40-1.65	2-6	0.05-0.09	0.0-2.9	3.5-6.0	0.0-0.5	.10	.28	
Burton, very rocky	0-11	10-22	1.10-1.30	2-6	0.11-0.16	0.0-2.9	3.5-6.0	10-20	.02	.02	2
	11-25	10-25	1.45-1.65	2-6	0.07-0.12	0.0-2.9	3.5-6.0	0.0-1.0	.15	.28	
	25-80	---	---	---	0.00-0.01	---	---	---	---	---	
WrC:											
Wayah, windswept--	0-14	10-25	1.00-1.20	2-6	0.16-0.22	0.0-2.9	3.5-5.5	10-20	.02	.02	5
	14-48	10-25	1.20-1.60	2-6	0.09-0.13	0.0-2.9	3.5-6.0	0.0-1.0	.15	.20	
	48-80	3-15	1.40-1.65	2-6	0.05-0.09	0.0-2.9	3.5-6.0	0.0-0.5	.10	.28	
Burton, windswept-	0-15	20-35	1.10-1.30	2-6	0.16-0.23	0.0-2.9	3.5-6.0	10-20	.02	.02	2
	15-24	5-18	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.5-6.0	0.0-1.0	.28	.37	
	24-27	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	27-80	---	---	---	0.00-0.01	---	---	---	---	---	
WrD:											
Wayah, windswept--	0-14	10-25	1.00-1.20	2-6	0.16-0.22	0.0-2.9	3.5-5.5	10-20	.02	.02	5
	14-48	10-25	1.20-1.60	2-6	0.09-0.13	0.0-2.9	3.5-6.0	0.0-1.0	.15	.20	
	48-80	3-15	1.40-1.65	2-6	0.05-0.09	0.0-2.9	3.5-6.0	0.0-0.5	.10	.28	
Burton, windswept-	0-15	20-35	1.10-1.30	2-6	0.16-0.23	0.0-2.9	3.5-6.0	10-20	.02	.02	2
	15-24	5-18	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.5-6.0	0.0-1.0	.28	.37	
	24-27	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	27-80	---	---	---	0.00-0.01	---	---	---	---	---	
WrE:											
Wayah, windswept--	0-14	10-25	1.00-1.20	2-6	0.16-0.22	0.0-2.9	3.5-5.5	10-20	.02	.02	5
	14-48	10-25	1.20-1.60	2-6	0.09-0.13	0.0-2.9	3.5-6.0	0.0-1.0	.15	.20	
	48-80	3-15	1.40-1.65	2-6	0.05-0.09	0.0-2.9	3.5-6.0	0.0-0.5	.10	.28	
Burton, windswept-	0-15	20-35	1.10-1.30	2-6	0.16-0.23	0.0-2.9	3.5-6.0	10-20	.02	.02	2
	15-24	5-18	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.5-6.0	0.0-1.0	.28	.37	
	24-27	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	27-80	---	---	---	0.00-0.01	---	---	---	---	---	
WsF:											
Wayah, windswept--	0-14	10-25	1.00-1.20	2-6	0.16-0.22	0.0-2.9	3.5-5.5	10-20	.02	.02	5
	14-48	10-25	1.20-1.60	2-6	0.09-0.13	0.0-2.9	3.5-6.0	0.0-1.0	.15	.20	
	48-80	3-15	1.40-1.65	2-6	0.05-0.09	0.0-2.9	3.5-6.0	0.0-0.5	.10	.28	
Burton, windswept-	0-15	20-35	1.10-1.30	2-6	0.16-0.23	0.0-2.9	3.5-6.0	10-20	.02	.02	2
	15-24	5-18	1.35-1.60	2-6	0.10-0.15	0.0-2.9	3.5-6.0	0.0-1.0	.28	.37	
	24-27	---	---	---	0.00-0.01	---	---	0.0-0.5	---	---	
	27-80	---	---	---	0.00-0.01	---	---	---	---	---	
WtB:											
Whiteside---------	0-14	5-18	1.30-1.50	2-6	0.15-0.22	0.0-2.9	4.5-7.3	4.0-8.0	.15	.20	5
	14-47	18-27	1.35-1.55	0.6-2	0.14-0.20	0.0-2.9	4.5-6.0	0.0-1.0	.17	.24	
	47-53	3-20	1.40-1.60	2-6	0.04-0.11	0.0-2.9	4.5-6.0	0.0-0.5	.20	.28	
	53-80	8-35	1.35-1.60	0.6-6	0.10-0.16	0.0-2.9	4.5-6.0	0.0-0.5	.17	.24	

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Soil reaction	Organic matter	Erosion factors		
									Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct			
WtC:											
Whiteside---------	0-14	5-18	1.30-1.50	2-6	0.15-0.22	0.0-2.9	4.5-7.3	4.0-8.0	.15	.20	5
	14-47	18-27	1.35-1.55	0.6-2	0.14-0.20	0.0-2.9	4.5-6.0	0.0-1.0	.17	.24	
	47-53	3-20	1.40-1.60	2-6	0.04-0.11	0.0-2.9	4.5-6.0	0.0-0.5	.20	.28	
	53-80	8-35	1.35-1.60	0.6-6	0.10-0.16	0.0-2.9	4.5-6.0	0.0-0.5	.17	.24	
ZcB:											
Zillicoa----------	0-9	10-25	1.35-1.65	0.6-6	0.14-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.32	.32	4
	9-36	35-60	1.20-1.40	0.06-0.2	0.12-0.15	0.0-2.9	5.1-7.8	0.0-1.0	.28	.28	
	36-48	20-35	1.30-1.50	0.6-2	0.12-0.15	0.0-2.9	5.1-6.5	0.0-1.0	.24	.24	
	48-80	---	---	---	---	---	---	0.0-0.0	---	---	
ZcC:											
Zillicoa----------	0-9	10-25	1.35-1.65	0.6-6	0.14-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.32	.32	4
	9-36	35-60	1.20-1.40	0.06-0.2	0.12-0.15	0.0-2.9	5.1-7.8	0.0-1.0	.28	.28	
	36-48	20-35	1.30-1.50	0.6-2	0.12-0.15	0.0-2.9	5.1-6.5	0.0-1.0	.24	.24	
	48-80	---	---	---	---	---	---	0.0-0.0	---	---	
ZoD:											
Zillicoa, stony---	0-9	10-25	1.35-1.65	0.6-6	0.14-0.20	0.0-2.9	4.5-6.0	2.0-6.0	.32	.32	4
	9-36	35-60	1.20-1.40	0.06-0.2	0.12-0.15	0.0-2.9	5.1-7.8	0.0-1.0	.28	.28	
	36-48	20-35	1.30-1.50	0.6-2	0.12-0.15	0.0-2.9	5.1-6.5	0.0-1.0	.24	.24	
	48-80	---	---	---	---	---	---	0.0-0.0	---	---	

Table 17.—Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not
data were not estimated)

Map symbol and soil name	Restrictive layer			Soil slippage potential	U
	Kind	Depth to top	Hardness		
		In			
AcD:					
Ashe, very stony	Lithic bedrock	20-40	Indurated	Low	
Cleveland, very stony	Lithic bedrock	10-20	Indurated	Low	
Rock outcrop	Lithic bedrock	0-0	Indurated	---	
ArE:					
Ashe, very bouldery	Lithic bedrock	20-40	Indurated	Medium	
Cleveland, very bouldery	Lithic bedrock	10-20	Indurated	High	
Rock outcrop	Lithic bedrock	0-0	Indurated	---	
ArF:					
Ashe, very bouldery	Lithic bedrock	20-40	Indurated	Medium	
Cleveland, very bouldery	Lithic bedrock	10-20	Indurated	High	
Rock outcrop	Lithic bedrock	0-0	Indurated	---	
BaD:					
Balsam, extremely bouldery	---	---	---	---	
Tanasee, extremely bouldery	---	---	---	---	
BaE:					
Balsam, extremely bouldery	---	---	---	Medium	
Tanasee, extremely bouldery	---	---	---	Low	
BeA:					
Biltmore, occasionally flooded	---	---	---	---	
BkB2:					
Braddock, moderately eroded	---	---	---	---	
BkC2:					
Braddock, moderately eroded	---	---	---	---	
BkD2:					
Braddock, moderately eroded	---	---	---	---	

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential
	Kind	Depth to top	Hardness	
		In		
BnB:				
Braddock	---	---	---	---
Urban land.				
BnC:				
Braddock	---	---	---	---
Urban land.				
BpF:				
Breakneck, windswept	Lithic bedrock	20-40	Very strongly cemented	Medium
Pullback, windswept	Lithic bedrock	10-20	Very strongly cemented	High
BwD:				
Burton, windswept	Lithic bedrock	20-40	Indurated	Low
Craggey, windswept	Lithic bedrock	10-20	Indurated	Low
BxE:				
Burton, windswept	Lithic bedrock	20-40	Indurated	Medium
Craggey, windswept	Lithic bedrock	10-20	Indurated	High
Rock outcrop	Lithic bedrock	0-0	Indurated	---
BxF:				
Burton, windswept	Lithic bedrock	20-40	Indurated	Medium
Craggey, windswept	Lithic bedrock	10-20	Indurated	High
Rock outcrop	Lithic bedrock	0-0	Indurated	---
CaE:				
Cataska, very rocky	Paralithic bedrock	10-20	Moderately cemented	Medium
	Lithic bedrock	20-40	Very strongly cemented	
Sylco, very rocky	Lithic bedrock	20-40	Very strongly cemented	Medium

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	U
	Kind	Depth to top	Hardness		
		In			
CdF:					
Cataska, very stony	Paralithic bedrock	10-20	Moderately cemented	High	
	Lithic bedrock	20-40	Very strongly cemented		
Sylco, very stony	Lithic bedrock	20-40	Very strongly cemented	High	
Rock outcrop	Lithic bedrock	0-0	Very strongly cemented	---	
ChD:					
Cheoah, stony	Paralithic bedrock	40-60	Moderately cemented	---	
Jeffrey, stony	Lithic bedrock	20-40	Very strongly cemented	Low	
ChE:					
Cheoah, stony	Paralithic bedrock	40-60	Moderately cemented	Low	
Jeffrey, stony	Lithic bedrock	20-40	Very strongly cemented	Low	
ChF:					
Cheoah, stony	Paralithic bedrock	40-60	Moderately cemented	Medium	
Jeffrey, stony	Lithic bedrock	20-40	Very strongly cemented	Medium	
CkB2:					
Clifton, moderately eroded	---	---	---	---	
CkC2:					
Clifton, moderately eroded	---	---	---	---	
CkD2:					
Clifton, moderately eroded	---	---	---	---	
CkE2:					
Clifton, moderately eroded	---	---	---	Low	
CsB:					
Clifton, stony	---	---	---	---	

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	U
	Kind	Depth to top	Hardness		
		In			
CsC:					
Clifton, stony	---	---	---	---	
CsD:					
Clifton, stony	---	---	---	---	
CuB:					
Clifton	---	---	---	---	
Urban land.					
CuC:					
Clifton	---	---	---	---	
Urban land.					
CuD:					
Clifton	---	---	---	---	
Urban land.					
CxE:					
Craggey, windswept	Lithic bedrock	10-20	Indurated	High	
Rock outcrop	Lithic bedrock	0-0	Indurated	---	
Clingman, windswept	Lithic bedrock	3-20	Indurated	High	
CxF:					
Craggey, windswept	Lithic bedrock	10-20	Indurated	High	
Rock outcrop	Lithic bedrock	0-0	Indurated	---	
Clingman, windswept	Lithic bedrock	3-20	Indurated	High	
DAM.					
Dam					
DeA:					
Dellwood, occasionally flooded	Strongly contrasting textural stratification	8-20	Noncemented	---	
Reddies, occasionally flooded	Strongly contrasting textural stratification	20-40	Noncemented	---	

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Hardness	Soil slippage potential	U
		In			
DrB:					
Dillard, rarely flooded	---	---	---	---	
EdC:					
Edneyville, stony	---	---	---	---	
Chestnut, stony	Paralithic bedrock	20-40	Moderately cemented	---	
EdD:					
Edneyville, stony	---	---	---	---	
Chestnut, stony	Paralithic bedrock	20-40	Moderately cemented	---	
EdE:					
Edneyville, stony	---	---	---	Low	
Chestnut, stony	Paralithic bedrock	20-40	Moderately cemented	Low	
EdF:					
Edneyville, stony	---	---	---	Medium	
Chestnut, stony	Paralithic bedrock	20-40	Moderately cemented	Medium	
EvD2:					
Evard, moderately eroded	---	---	---	---	M
Cowee, moderately eroded	Paralithic bedrock	20-40	Moderately cemented	---	M
EvE2:					
Evard, moderately eroded	---	---	---	Low	M
Cowee, moderately eroded	Paralithic bedrock	20-40	Moderately cemented	Low	M
EvF2:					
Evard, moderately eroded	---	---	---	Medium	M
Cowee, moderately eroded	Paralithic bedrock	20-40	Moderately cemented	Medium	M

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	U
	Kind	Depth to top	Hardness		
		In			
EwC:					
Evard, stony	---	---	---	---	M
Cowee, stony	Paralithic bedrock	20-40	Moderately cemented	---	M
EwD:					
Evard, stony	---	---	---	---	M
Cowee, stony	Paralithic bedrock	20-40	Moderately cemented	---	M
EwE:					
Evard, stony	---	---	---	Low	M
Cowee, stony	Paralithic bedrock	20-40	Moderately cemented	Low	M
EwF:					
Evard, stony	---	---	---	Medium	M
Cowee, stony	Paralithic bedrock	20-40	Moderately cemented	Medium	M
ExC:					
Evard	---	---	---	---	M
Cowee	Paralithic bedrock	20-40	Moderately cemented	---	M
Urban land.					
ExD:					
Evard	---	---	---	---	M
Cowee	Paralithic bedrock	20-40	Moderately cemented	---	M
Urban land.					
ExE:					
Evard	---	---	---	Low	M
Cowee	Paralithic bedrock	20-40	Moderately cemented	Low	M
Urban land.					

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Hardness	Soil slippage potential	U
		In			
FaC2:					
Fannin, moderately eroded-------------	---	---	---	---	M
Lauada, moderately eroded-------------	Paralithic bedrock	20-40	Moderately cemented	---	M
FaD2:					
Fannin, moderately eroded-------------	---	---	---	Low	M
Lauada, moderately eroded-------------	Paralithic bedrock	20-40	Moderately cemented	Low	M
FaE2:					
Fannin, moderately eroded-------------	---	---	---	Medium	M
Lauada, moderately eroded-------------	Paralithic bedrock	20-40	Moderately cemented	Medium	M
FnB:					
Fannin, moderately eroded-------------	---	---	---	---	M
Lauada, moderately eroded-------------	Paralithic bedrock	20-40	Moderately cemented	---	M
Urban land.					
FnC:					
Fannin, moderately eroded-------------	---	---	---	---	M
Lauada, moderately eroded-------------	Paralithic bedrock	20-40	Moderately cemented	---	M
Urban land.					
FnD:					
Fannin, moderately eroded-------------	---	---	---	Low	M
Lauada, moderately eroded-------------	Paralithic bedrock	20-40	Moderately cemented	Low	M
Urban land.					
FrA:					
French, occasionally flooded----------	Strongly contrasting textural stratification	20-40	Noncemented	---	

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	U
	Kind	Depth to top	Hardness		
		In			
HcE:					
Heintooga, very stony	---	---	---	Medium	
Chiltoskie, very stony	---	---	---	Low	
HpA:					
Hemphill, rarely flooded	---	---	---	---	M
IoA:					
Iotla, occasionally flooded	---	---	---	---	
JbB:					
Junaluska	Paralithic bedrock	20-40	Moderately cemented	---	M
Brasstown	Paralithic bedrock	40-60	Moderately cemented	---	M
JbC:					
Junaluska	Paralithic bedrock	20-40	Moderately cemented	---	M
Brasstown	Paralithic bedrock	40-60	Moderately cemented	---	M
JbD:					
Junaluska	Paralithic bedrock	20-40	Moderately cemented	---	M
Brasstown	Paralithic bedrock	40-60	Moderately cemented	---	M
JbE:					
Junaluska	Paralithic bedrock	20-40	Moderately cemented	Low	M
Brasstown	Paralithic bedrock	40-60	Moderately cemented	Low	M
KsB:					
Kanuga	---	---	---	---	
Swannanoa	---	---	---	---	

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	U
	Kind	Depth to top	Hardness		
		In			
KsC:					
Kanuga	---	---	---	---	
Swannanoa	---	---	---	---	
MvD:					
Mars Hill, stony	Paralithic bedrock	40-60	Moderately cemented	---	
Walnut, stony	Paralithic bedrock	20-40	Moderately cemented	---	
MvE:					
Mars Hill, stony	Paralithic bedrock	40-60	Moderately cemented	Low	
Walnut, stony	Paralithic bedrock	20-40	Moderately cemented	Low	
MvF:					
Mars Hill, stony	Paralithic bedrock	40-60	Moderately cemented	Medium	
Walnut, stony	Paralithic bedrock	20-40	Moderately cemented	Medium	
MwD:					
Micaville, stony	Paralithic bedrock	40-60	Moderately cemented	Low	M
Brownwood, stony	Paralithic bedrock	20-40	Moderately cemented	Low	
MwE:					
Micaville, stony	Paralithic bedrock	40-60	Moderately cemented	Medium	M
Brownwood, stony	Paralithic bedrock	20-40	Moderately cemented	Medium	
MwF:					
Micaville, stony	Paralithic bedrock	40-60	Moderately cemented	High	M
Brownwood, stony	Paralithic bedrock	20-40	Moderately cemented	High	

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	U
	Kind	Depth to top	Hardness		
		In			
NkA:					
Nikwasi, frequently flooded	Strongly contrasting textural stratification	20-40	Noncemented	---	
NtD:					
Northcove, very stony	---	---	---	---	
Maymead, very stony	---	---	---	---	
NtE:					
Northcove, very stony	---	---	---	Medium	
Maymead, very stony	---	---	---	Low	
OwC:					
Oconaluftee, windswept	---	---	---	---	
Guyot, windswept	Paralithic bedrock	40-60	Moderately cemented	---	
Cataloochee, windswept	Paralithic bedrock	20-40	Moderately cemented	---	
OwD:					
Oconaluftee, windswept	---	---	---	---	
Guyot, windswept	Paralithic bedrock	40-60	Moderately cemented	---	
Cataloochee, windswept	Paralithic bedrock	20-40	Moderately cemented	---	
OwE:					
Oconaluftee, windswept	---	---	---	Low	
Guyot, windswept	Paralithic bedrock	40-60	Moderately cemented	Low	
Cataloochee, windswept	Paralithic bedrock	20-40	Moderately cemented	Low	

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Hardness	Soil slippage potential	U
		In			
OwF:					
Oconaluftee, windswept	---	---	---	Medium	
Guyot, windswept	Paralithic bedrock	40-60	Moderately cemented	Medium	
Cataloochee, windswept	Paralithic bedrock	20-40	Moderately cemented	Medium	
Pg.					
Pits, gravel					
Pt.					
Pits, quarry					
PwC:					
Porters, stony	Lithic bedrock	40-60	Very strongly cemented	---	
Unaka, stony	Paralithic bedrock	20-35	Moderately cemented	---	
	Lithic bedrock	20-40	Very strongly cemented		
PwD:					
Porters, stony	Lithic bedrock	40-60	Very strongly cemented	---	
Unaka, stony	Paralithic bedrock	20-35	Moderately cemented	Low	
	Lithic bedrock	20-40	Very strongly cemented		
PwE:					
Porters, stony	Lithic bedrock	40-60	Very strongly cemented	Low	
Unaka, stony	Paralithic bedrock	20-35	Moderately cemented	Low	
	Lithic bedrock	20-40	Very strongly cemented		
PxF:					
Porters, rocky	Lithic bedrock	40-60	Very strongly cemented	Medium	

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	U
	Kind	Depth to top	Hardness		
		In			
PxF:					
Unaka, rocky	Paralithic bedrock	20-35	Moderately cemented	Medium	
	Lithic bedrock	20-40	Very strongly cemented		
RdA:					
Reddies, occasionally flooded	Strongly contrasting textural stratification	20-40	Noncemented	---	
RkF:					
Rock outcrop	Lithic bedrock	0-0	Indurated	---	
Cleveland, very bouldery	Lithic bedrock	10-20	Indurated	High	
RoF:					
Rock outcrop	Lithic bedrock	0-0	Indurated	---	
Oteen, very bouldery	Paralithic bedrock	10-20	Moderately cemented	High	
RsA:					
Rosman, occasionally flooded	---	---	---	---	M
SoD:					
Soco, stony	Paralithic bedrock	20-40	Moderately cemented	---	M
Stecoah, stony	Paralithic bedrock	40-60	Moderately cemented	---	M
SoE:					
Soco, stony	Paralithic bedrock	20-40	Moderately cemented	Low	M
Stecoah, stony	Paralithic bedrock	40-60	Moderately cemented	Low	M
SoF:					
Soco, stony	Paralithic bedrock	20-40	Moderately cemented	Medium	M
Stecoah, stony	Paralithic bedrock	40-60	Moderately cemented	Medium	M

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	U
	Kind	Depth to top	Hardness		
		In			
StB:					
Statler, rarely flooded	---	---	---	---	
SyD:					
Sylco, stony	Lithic bedrock	20-40	Very strongly cemented	Low	
Soco, stony	Paralithic bedrock	20-40	Moderately cemented	---	M
SyE:					
Sylco, stony	Lithic bedrock	20-40	Very strongly cemented	Medium	
Soco, stony	Paralithic bedrock	20-40	Moderately cemented	Low	M
SzF:					
Sylco, very stony	Lithic bedrock	20-40	Very strongly cemented	High	
Soco, very stony	Paralithic bedrock	20-40	Moderately cemented	Medium	M
TaB:					
Tate	---	---	---	---	M
TaC:					
Tate	---	---	---	---	M
TaD:					
Tate	---	---	---	---	M
TkC:					
Tate, very stony	---	---	---	---	M
TkD:					
Tate, very stony	---	---	---	---	M
TmB:					
Tate	---	---	---	---	M
Urban land.					
TmC:					
Tate	---	---	---	---	M
Urban land.					

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	U
	Kind	Depth to top	Hardness		
		In			
TmD:					
Tate	---	---	---	---	M
Urban land.					
TnE:					
Toecane, extremely bouldery	---	---	---	Medium	
ToC:					
Toecane, bouldery	---	---	---	---	
Tusquitee, bouldery	---	---	---	---	M
TpD:					
Toecane, very bouldery	---	---	---	---	
Tusquitee, very bouldery	---	---	---	---	M
TpE:					
Toecane, very bouldery	---	---	---	Medium	
Tusquitee, very bouldery	---	---	---	Low	M
TsA:					
Toxaway, frequently flooded	---	---	---	---	
TtE:					
Trimont, stony	---	---	---	Low	
TuD:					
Tusquitee, stony	---	---	---	---	M
Toecane, stony	---	---	---	---	
TwB:					
Tusquitee	---	---	---	---	M
Whiteside	---	---	---	---	M
TwC:					
Tusquitee	---	---	---	---	M
Whiteside	---	---	---	---	M
UcB:					
Udifluvents, frequently flooded	---	---	---	---	

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	U
	Kind	Depth to top	Hardness		
		In			
Ud:					
Udorthents, loamy	---	---	---	---	M
UfB:					
Udorthents, occasionally flooded	---	---	---	---	M
Urban land, occasionally flooded.					
UhE:					
Udorthents, rocky	---	---	---	Medium	
Urban land.					
UkD:					
Unaka, very bouldery	Paralithic bedrock	20-35	Moderately cemented	Low	
	Lithic bedrock	20-40	Indurated		
Rock outcrop	Lithic bedrock	0-0	Indurated	---	
UkE:					
Unaka, very bouldery	Paralithic bedrock	20-35	Moderately cemented	Medium	
	Lithic bedrock	20-40	Indurated		
Rock outcrop	Lithic bedrock	0-0	Indurated	---	
UkF:					
Unaka, very bouldery	Paralithic bedrock	20-35	Moderately cemented	High	
	Lithic bedrock	20-40	Indurated		
Rock outcrop	Lithic bedrock	0-0	Indurated	---	
UnB:					
Unison	---	---	---	---	
UnC:					
Unison	---	---	---	---	
UnD:					
Unison	---	---	---	---	
UrB:					
Unison	---	---	---	---	
Urban land.					

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential	U
	Kind	Depth to top	Hardness		
		In			
UrC:					
Unison------------------------------	---	---	---	---	
Urban land.					
Ux.					
Urban land					
W.					
Water					
WaC2:					
Walnut, moderately eroded-------------	Paralithic bedrock	20-40	Moderately cemented	---	
Oteen, moderately eroded--------------	Paralithic bedrock	10-20	Moderately cemented	---	
Mars Hill, moderately eroded----------	Paralithic bedrock	40-60	Moderately cemented	---	
WaD2:					
Walnut, moderately eroded-------------	Paralithic bedrock	20-40	Moderately cemented	---	
Oteen, moderately eroded--------------	Paralithic bedrock	10-20	Moderately cemented	---	
Mars Hill, moderately eroded----------	Paralithic bedrock	40-60	Moderately cemented	---	
WaE2:					
Walnut, moderately eroded-------------	Paralithic bedrock	20-40	Moderately cemented	Low	
Oteen, moderately eroded--------------	Paralithic bedrock	10-20	Moderately cemented	Low	
Mars Hill, moderately eroded----------	Paralithic bedrock	40-60	Moderately cemented	Low	
WnF:					
Walnut--------------------------------	Paralithic bedrock	20-40	Moderately cemented	Medium	
Oteen---------------------------------	Paralithic bedrock	10-20	Moderately cemented	High	
Rock outcrop--------------------------	Lithic bedrock	0-0	Indurated	---	

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Hardness	Soil slippage potential	U
		In			
WoE:					
Wayah, bouldery	---	---	---	Low	
Burton, bouldery	Lithic bedrock	20-40	Indurated	Low	
WpF:					
Wayah, very rocky	---	---	---	Medium	
Burton, very rocky	Lithic bedrock	20-40	Indurated	Medium	
WrC:					
Wayah, windswept	---	---	---	---	
Burton, windswept	Lithic bedrock	20-40	Indurated	---	
	Paralithic bedrock	20-40	Strongly cemented		
WrD:					
Wayah, windswept	---	---	---	---	
Burton, windswept	Paralithic bedrock	20-40	Strongly cemented	---	
	Lithic bedrock	20-40	Indurated		
WrE:					
Wayah, windswept	---	---	---	Low	
Burton, windswept	Paralithic bedrock	20-40	Strongly cemented	Low	
	Lithic bedrock	20-40	Indurated		
WsF:					
Wayah, windswept	---	---	---	Medium	
Burton, windswept	Lithic bedrock	20-40	Indurated	Medium	
WtB:					
Whiteside	---	---	---	---	M
WtC:					
Whiteside	---	---	---	---	M
ZcB:					
Zillicoa	Paralithic bedrock	40-60	Moderately cemented	---	

Table 17.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Soil slippage potential
	Kind	Depth to top	Hardness	
		In		
ZcC:				
Zillicoa	Paralithic bedrock	40-60	Moderately cemented	---
ZoD:				
Zillicoa, stony	Paralithic bedrock	40-60	Moderately cemented	---

Table 18.—Water Features

(Depths of layers are in feet. See text for definitions of terms used in this table. Estimates of the freq flooding apply to the whole year rather than to individual months. Absence of an entry indicates that a concern or that data were not estimated)

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	D
				Ft	Ft	Ft			
AcD:									
Ashe	B	Very high	Jan-Dec	---	---	---	---	None	
Cleveland	C	Very high	Jan-Dec	---	---	---	---	None	
Rock outcrop	D	Very high	Jan-Dec	---	---	---	---	None	
ArE:									
Ashe	B	Very high	Jan-Dec	---	---	---	---	None	
Cleveland	C	Very high	Jan-Dec	---	---	---	---	None	
Rock outcrop	D	Very high	Jan-Dec	---	---	---	---	None	
ArF:									
Ashe	B	Very high	Jan-Dec	---	---	---	---	None	
Cleveland	C	Very high	Jan-Dec	---	---	---	---	None	
Rock outcrop	D	Very high	Jan-Dec	---	---	---	---	None	
BaD:									
Balsam	A	Medium	Jan-Dec	---	---	---	---	None	
Tanasee	A	Medium	Jan-Dec	---	---	---	---	None	
BaE:									
Balsam	A	Medium	Jan-Dec	---	---	---	---	None	
Tanasee	A	Medium	Jan-Dec	---	---	---	---	None	
BeA:									
Biltmore	A	Very low	Jan-May	3.5-6.0	>6.0	---	---	None	Ve
			Jun-Nov	4.0-6.5	>6.0	---	---	None	
			Dec	3.5-6.0	>6.0	---	---	None	Ve
BkB2:									
Braddock	B	Medium	Jan-Dec	---	---	---	---	None	
BkC2:									
Braddock	B	Medium	Jan-Dec	---	---	---	---	None	

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	D
				Ft	Ft	Ft			
BkD2:									
Braddock	B	High	Jan-Dec	---	---	---	---	None	
BnB:									
Braddock	B	Medium	Jan-Dec	---	---	---	---	None	
Urban land.									
BnC:									
Braddock	B	Medium	Jan-Dec	---	---	---	---	None	
Urban land.									
BpF:									
Breakneck	B	Very high	Jan-Dec	---	---	---	---	None	
Pullback	D	Very high	Jan-Dec	---	---	---	---	None	
BwD:									
Burton	B	Very high	Jan-Dec	---	---	---	---	None	
Craggey	D	Very high	Jan-Dec	---	---	---	---	None	
BxE:									
Burton	B	Very high	Jan-Dec	---	---	---	---	None	
Craggey	D	Very high	Jan-Dec	---	---	---	---	None	
Rock outcrop	D	Very high	Jan-Dec	---	---	---	---	None	
BxF:									
Burton	B	Very high	Jan-Dec	---	---	---	---	None	
Craggey	D	Very high	Jan-Dec	---	---	---	---	None	
Rock outcrop	D	Very high	Jan-Dec	---	---	---	---	None	
CaE:									
Cataska	D	High	Jan-Dec	---	---	---	---	None	
Sylco	C	High	Jan-Dec	---	---	---	---	None	
CdF:									
Cataska	D	High	Jan-Dec	---	---	---	---	None	
Sylco	C	High	Jan-Dec	---	---	---	---	None	
Rock outcrop	D	Very high	Jan-Dec	---	---	---	---	None	

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Surface water depth	Ponding: Duration	Ponding: Frequency
				Ft	Ft	Ft		
ChD:								
Cheoah	B	Medium	Jan-Dec	---	---	---	---	None
Jeffrey	B	Very high	Jan-Dec	---	---	---	---	None
ChE:								
Cheoah	B	Medium	Jan-Dec	---	---	---	---	None
Jeffrey	B	Very high	Jan-Dec	---	---	---	---	None
ChF:								
Cheoah	B	Medium	Jan-Dec	---	---	---	---	None
Jeffrey	B	Very high	Jan-Dec	---	---	---	---	None
CkB2:								
Clifton	B	Medium	Jan-Dec	---	---	---	---	None
CkC2:								
Clifton	B	Medium	Jan-Dec	---	---	---	---	None
CkD2:								
Clifton	B	High	Jan-Dec	---	---	---	---	None
CkE2:								
Clifton	B	High	Jan-Dec	---	---	---	---	None
CsB:								
Clifton	B	Medium	Jan-Dec	---	---	---	---	None
CsC:								
Clifton	B	Medium	Jan-Dec	---	---	---	---	None
CsD:								
Clifton	B	High	Jan-Dec	---	---	---	---	None
CuB:								
Clifton	B	Medium	Jan-Dec	---	---	---	---	None
Urban land.								
CuC:								
Clifton	B	Medium	Jan-Dec	---	---	---	---	None
Urban land.								

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	D
				Ft	Ft	Ft			
CuD:									
Clifton	B	High	Jan-Dec	---	---	---	---	None	
Urban land.									
CxE:									
Craggey	D	Very high	Jan-Dec	---	---	---	---	None	
Rock outcrop	D	Very high	Jan-Dec	---	---	---	---	None	
Clingman	D	Very high	Jan-Dec	---	---	---	---	None	
CxF:									
Craggey	D	Very high	Jan-Dec	---	---	---	---	None	
Rock outcrop	D	Very high	Jan-Dec	---	---	---	---	None	
Clingman	D	Very high	Jan-Dec	---	---	---	---	None	
DAM:									
Dam	---	---	Jan-Dec	---	---	---	---	None	
DeA:									
Dellwood	A	Very low	Jan-May	2.0-4.0	>6.0	---	---	None	Ve
			Jun-Nov	2.5-4.5	>6.0	---	---	None	
			Dec	2.0-4.0	>6.0	---	---	None	Ve
Reddies	B	Very low	Jan-May	2.0-3.5	>6.0	---	---	None	Ve
			Jun-Nov	2.5-4.0	>6.0	---	---	None	
			Dec	2.0-3.5	>6.0	---	---	None	Ve
DrB:									
Dillard	C	Low	Jan-May	2.0-3.0	>6.0	---	---	None	
			Jun-Nov	2.5-3.5	>6.0	---	---	None	
			Dec	2.0-3.0	>6.0	---	---	None	
EdC:									
Edneyville	A	Low	Jan-Dec	---	---	---	---	None	
Chestnut	B	Medium	Jan-Dec	---	---	---	---	None	
EdD:									
Edneyville	A	Medium	Jan-Dec	---	---	---	---	None	
Chestnut	B	High	Jan-Dec	---	---	---	---	None	

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency
				Ft	Ft	Ft		
EdE:								
Edneyville	A	Medium	Jan-Dec	---	---	---	---	None
Chestnut	B	High	Jan-Dec	---	---	---	---	None
EdF:								
Edneyville	A	Medium	Jan-Dec	---	---	---	---	None
Chestnut	B	High	Jan-Dec	---	---	---	---	None
EvD2:								
Evard	B	High	Jan-Dec	---	---	---	---	None
Cowee	B	High	Jan-Dec	---	---	---	---	None
EvE2:								
Evard	B	High	Jan-Dec	---	---	---	---	None
Cowee	B	High	Jan-Dec	---	---	---	---	None
EvF2:								
Evard	B	High	Jan-Dec	---	---	---	---	None
Cowee	B	High	Jan-Dec	---	---	---	---	None
EwC:								
Evard	B	Medium	Jan-Dec	---	---	---	---	None
Cowee	B	Medium	Jan-Dec	---	---	---	---	None
EwD:								
Evard	B	High	Jan-Dec	---	---	---	---	None
Cowee	B	High	Jan-Dec	---	---	---	---	None
EwE:								
Evard	B	High	Jan-Dec	---	---	---	---	None
Cowee	B	High	Jan-Dec	---	---	---	---	None
EwF:								
Evard	B	High	Jan-Dec	---	---	---	---	None
Cowee	B	High	Jan-Dec	---	---	---	---	None

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	D
				Ft	Ft	Ft			
ExC:									
Evard	B	Medium	Jan-Dec	---	---	---	---	None	
Cowee	B	Medium	Jan-Dec	---	---	---	---	None	
Urban land.									
ExD:									
Evard	B	High	Jan-Dec	---	---	---	---	None	
Cowee	B	High	Jan-Dec	---	---	---	---	None	
Urban land.									
ExE:									
Evard	B	High	Jan-Dec	---	---	---	---	None	
Cowee	B	High	Jan-Dec	---	---	---	---	None	
Urban land.									
FaC2:									
Fannin	B	Medium	Jan-Dec	---	---	---	---	None	
Lauada	B	Medium	Jan-Dec	---	---	---	---	None	
FaD2:									
Fannin	B	High	Jan-Dec	---	---	---	---	None	
Lauada	B	High	Jan-Dec	---	---	---	---	None	
FaE2:									
Fannin	B	High	Jan-Dec	---	---	---	---	None	
Lauada	B	High	Jan-Dec	---	---	---	---	None	
FnB:									
Fannin	B	Medium	Jan-Dec	---	---	---	---	None	
Lauada	B	Medium	Jan-Dec	---	---	---	---	None	
Urban land.									

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table Upper limit	Water table Lower limit	Ponding Surface water depth	Ponding Duration	Ponding Frequency	D
				Ft	Ft	Ft			
FnC:									
Fannin	B	Medium	Jan-Dec	---	---	---	---	None	
Lauada	B	Medium	Jan-Dec	---	---	---	---	None	
Urban land.									
FnD:									
Fannin	B	High	Jan-Dec	---	---	---	---	None	
Lauada	B	High	Jan-Dec	---	---	---	---	None	
Urban land.									
FrA:									
French	C	Low	Jan-May	1.0-2.5	>6.0	---	---	None	Ve
			Jun-Nov	2.0-3.5	>6.0	---	---	None	
			Dec	1.0-2.5	>6.0	---	---	None	Ve
HcE:									
Heintooga	A	Medium	Jan-Dec	---	---	---	---	None	
Chiltoskie	B	Medium	Jan-Dec	---	---	---	---	None	
HpA:									
Hemphill	D	Very high	Jan-May	0.0-1.0	>6.0	---	---	None	
			Jun-Nov	0.5-1.5	>6.0	---	---	None	
			Dec	0.0-1.0	>6.0	---	---	None	
IoA:									
Iotla	B	Very low	Jan-May	1.5-2.0	>6.0	---	---	None	Ve
			Jun-Nov	2.0-2.5	>6.0	---	---	None	
			Dec	1.5-2.0	>6.0	---	---	None	Ve
JbB:									
Junaluska	B	Medium	Jan-Dec	---	---	---	---	None	
Brasstown	B	Medium	Jan-Dec	---	---	---	---	None	
JbC:									
Junaluska	B	Medium	Jan-Dec	---	---	---	---	None	
Brasstown	B	Medium	Jan-Dec	---	---	---	---	None	

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	D
				Ft	Ft	Ft			
JbD:									
Junaluska----------------	B	High	Jan-Dec	---	---	---	---	None	
Brasstown----------------	B	High	Jan-Dec	---	---	---	---	None	
JbE:									
Junaluska----------------	B	High	Jan-Dec	---	---	---	---	None	
Brasstown----------------	B	High	Jan-Dec	---	---	---	---	None	
KsB:									
Kanuga-------------------	B	Medium	Jan-May	2.0-3.0	>6.0	---	---	None	
			Jun-Nov	2.5-3.5	>6.0	---	---	None	
			Dec	2.0-3.0	>6.0	---	---	None	
Swannanoa----------------	C	Medium	Jan-May	1.5-2.0	>6.0	---	---	None	
			Jun-Nov	2.0-2.5	>6.0	---	---	None	
			Dec	1.5-2.0	>6.0	---	---	None	
KsC:									
Kanuga-------------------	B	Medium	Jan-May	2.0-3.0	>6.0	---	---	None	
			Jun-Nov	2.5-3.5	>6.0	---	---	None	
			Dec	2.0-3.0	>6.0	---	---	None	
Swannanoa----------------	C	Medium	Jan-May	1.5-2.0	>6.0	---	---	None	
			Jun-Nov	2.0-2.5	>6.0	---	---	None	
			Dec	1.5-2.0	>6.0	---	---	None	
MvD:									
Mars Hill----------------	B	Medium	Jan-Dec	---	---	---	---	None	
Walnut-------------------	B	High	Jan-Dec	---	---	---	---	None	
MvE:									
Mars Hill----------------	B	Medium	Jan-Dec	---	---	---	---	None	
Walnut-------------------	B	High	Jan-Dec	---	---	---	---	None	
MvF:									
Mars Hill----------------	B	Medium	Jan-Dec	---	---	---	---	None	
Walnut-------------------	B	High	Jan-Dec	---	---	---	---	None	
MwD:									
Micaville----------------	B	Medium	Jan-Dec	---	---	---	---	None	
Brownwood----------------	B	High	Jan-Dec	---	---	---	---	None	

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	D
				Ft	Ft	Ft			
MwE:									
Micaville------------------	B	Medium	Jan-Dec	---	---	---	---	None	
Brownwood------------------	B	High	Jan-Dec	---	---	---	---	None	
MwF:									
Micaville------------------	B	Medium	Jan-Dec	---	---	---	---	None	
Brownwood------------------	B	High	Jan-Dec	---	---	---	---	None	
NkA:									
Nikwasi--------------------	B/D	Negligible	Jan-May	0.0-1.0	>6.0	0.0-0.5	Brief	Occasional	Ve
			Jun-Nov	0.5-1.5	>6.0	0.0-0.5	Brief	Occasional	
			Dec	0.0-1.0	>6.0	0.0-0.5	Brief	Occasional	Ve
NtD:									
Northcove------------------	A	Medium	Jan-Dec	---	---	---	---	None	
Maymead--------------------	A	Medium	Jan-Dec	---	---	---	---	None	
NtE:									
Northcove------------------	A	Medium	Jan-Dec	---	---	---	---	None	
Maymead--------------------	A	Medium	Jan-Dec	---	---	---	---	None	
OwC:									
Oconaluftee----------------	A	Low	Jan-Dec	---	---	---	---	None	
Guyot----------------------	B	Medium	Jan-Dec	---	---	---	---	None	
Cataloochee----------------	B	Medium	Jan-Dec	---	---	---	---	None	
OwD:									
Oconaluftee----------------	A	Medium	Jan-Dec	---	---	---	---	None	
Guyot----------------------	B	High	Jan-Dec	---	---	---	---	None	
Cataloochee----------------	B	High	Jan-Dec	---	---	---	---	None	

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	D
				Ft	Ft	Ft			
OwE:									
Oconaluftee	A	Medium	Jan-Dec	---	---	---	---	None	
Guyot	B	High	Jan-Dec	---	---	---	---	None	
Cataloochee	B	High	Jan-Dec	---	---	---	---	None	
OwF:									
Oconaluftee	A	Medium	Jan-Dec	---	---	---	---	None	
Guyot	B	High	Jan-Dec	---	---	---	---	None	
Cataloochee	B	High	Jan-Dec	---	---	---	---	None	
Pg.									
Pits, gravel									
Pt.									
Pits, quarry									
PwC:									
Porters	B	Low	Jan-Dec	---	---	---	---	None	
Unaka	B	Very high	Jan-Dec	---	---	---	---	None	
PwD:									
Porters	B	Medium	Jan-Dec	---	---	---	---	None	
Unaka	B	Very high	Jan-Dec	---	---	---	---	None	
PwE:									
Porters	B	Medium	Jan-Dec	---	---	---	---	None	
Unaka	B	Very high	Jan-Dec	---	---	---	---	None	
PxF:									
Porters	B	Medium	Jan-Dec	---	---	---	---	None	
Unaka	B	Very high	Jan-Dec	---	---	---	---	None	
RdA:									
Reddies	B	Very low	Jan-May	2.0-3.5	>6.0	---	---	None	Ve
			Jun-Nov	2.5-4.0	>6.0	---	---	None	
			Dec	2.0-3.5	>6.0	---	---	None	Ve

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Surface water depth	Ponding: Duration	Ponding: Frequency	D
				Ft	Ft	Ft			
RkF:									
Rock outcrop	D	Very high	Jan-Dec	---	---	---	---	None	
Cleveland	C	Very high	Jan-Dec	---	---	---	---	None	
RoF:									
Rock outcrop	D	Very high	Jan-Dec	---	---	---	---	None	
Oteen	C	High	Jan-Dec	---	---	---	---	None	
RsA:									
Rosman	A	Very low	Jan-May	3.5-5.0	>6.0	---	---	None	Ve
			Jun-Nov	3.5-5.0	>6.0	---	---	None	
			Dec	3.5-5.0	>6.0	---	---	None	Ve
SoD:									
Soco	B	High	Jan-Dec	---	---	---	---	None	
Stecoah	B	Medium	Jan-Dec	---	---	---	---	None	
SoE:									
Soco	B	High	Jan-Dec	---	---	---	---	None	
Stecoah	B	Medium	Jan-Dec	---	---	---	---	None	
SoF:									
Soco	B	High	Jan-Dec	---	---	---	---	None	
Stecoah	B	Medium	Jan-Dec	---	---	---	---	None	
StB:									
Statler	B	Low	Jan-Dec	4.0-6.0	>6.0	---	---	None	
SyD:									
Sylco	C	High	Jan-Dec	---	---	---	---	None	
Soco	B	High	Jan-Dec	---	---	---	---	None	
SyE:									
Sylco	C	High	Jan-Dec	---	---	---	---	None	
Soco	B	High	Jan-Dec	---	---	---	---	None	
SzF:									
Sylco	C	High	Jan-Dec	---	---	---	---	None	
Soco	B	High	Jan-Dec	---	---	---	---	None	

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	D
				Ft	Ft	Ft			
TaB:									
Tate	B	Medium	Jan-Dec	---	---	---	---	None	
TaC:									
Tate	B	Medium	Jan-Dec	---	---	---	---	None	
TaD:									
Tate	B	High	Jan-Dec	---	---	---	---	None	
TkC:									
Tate	B	Medium	Jan-Dec	---	---	---	---	None	
TkD:									
Tate	B	High	Jan-Dec	---	---	---	---	None	
TmB:									
Tate	B	Medium	Jan-Dec	---	---	---	---	None	
Urban land.									
TmC:									
Tate	B	Medium	Jan-Dec	---	---	---	---	None	
Urban land.									
TmD:									
Tate	B	High	Jan-Dec	---	---	---	---	None	
Urban land.									
TnE:									
Toecane	A	Medium	Jan-Dec	---	---	---	---	None	
ToC:									
Toecane	A	Low	Jan-Dec	---	---	---	---	None	
Tusquitee	B	Low	Jan-Dec	---	---	---	---	None	
TpD:									
Toecane	A	Medium	Jan-Dec	---	---	---	---	None	
Tusquitee	B	Medium	Jan-Dec	---	---	---	---	None	
TpE:									
Toecane	A	Medium	Jan-Dec	---	---	---	---	None	
Tusquitee	B	Medium	Jan-Dec	---	---	---	---	None	

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	D
				Ft	Ft	Ft			
TsA:									
Toxaway-------------------	B/D	Very high	Jan-May	0.0-1.0	>6.0	---	---	None	Ve
			Jun-Nov	0.5-1.5	>6.0	---	---	None	
			Dec	0.0-1.0	>6.0	---	---	None	Ve
TtE:									
Trimont-------------------	B	High	Jan-Dec	---	---	---	---	None	
TuD:									
Tusquitee-----------------	B	Medium	Jan-Dec	---	---	---	---	None	
Toecane-------------------	A	Medium	Jan-Dec	---	---	---	---	None	
TwB:									
Tusquitee-----------------	B	Low	Jan-Dec	---	---	---	---	None	
Whiteside-----------------	B	Medium	Jan-May	2.0-3.0	>6.0	---	---	None	
			Jun-Nov	2.0-3.5	>6.0	---	---	None	
			Dec	2.0-3.0	>6.0	---	---	None	
TwC:									
Tusquitee-----------------	B	Low	Jan-Dec	---	---	---	---	None	
Whiteside-----------------	B	Medium	Jan-May	2.0-3.0	>6.0	---	---	None	
			Jun-Nov	2.0-3.5	>6.0	---	---	None	
			Dec	2.0-3.0	>6.0	---	---	None	
UcB:									
Udifluvents---------------	A	Very low	Jan-Dec	3.5-5.0	>6.0	---	---	None	Ve
Ud:									
Udorthents----------------	B	Medium	Jan-Dec	---	---	---	---	None	
UfB:									
Udorthents----------------	B	Low	Jan-Dec	---	---	---	---	None	Ve
Urban land.									
UhE:									
Udorthents----------------	B	High	Jan-Dec	---	---	---	---	None	
Urban land.									

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table		Ponding			D
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	
				Ft	Ft	Ft			
UkD:									
Unaka----------------------	B	Very high	Jan-Dec	---	---	---	---	None	
Rock outcrop---------------	D	Very high	Jan-Dec	---	---	---	---	None	
UkE:									
Unaka----------------------	B	Very high	Jan-Dec	---	---	---	---	None	
Rock outcrop---------------	D	Very high	Jan-Dec	---	---	---	---	None	
UkF:									
Unaka----------------------	B	Very high	Jan-Dec	---	---	---	---	None	
Rock outcrop---------------	D	Very high	Jan-Dec	---	---	---	---	None	
UnB:									
Unison---------------------	B	Medium	Jan-Dec	---	---	---	---	None	
UnC:									
Unison---------------------	B	Medium	Jan-Dec	---	---	---	---	None	
UnD:									
Unison---------------------	B	High	Jan-Dec	---	---	---	---	None	
UrB:									
Unison---------------------	B	Medium	Jan-Dec	---	---	---	---	None	
Urban land.									
UrC:									
Unison---------------------	B	Medium	Jan-Dec	---	---	---	---	None	
Urban land.									
Ux.									
Urban land									
WaC2:									
Walnut---------------------	B	Medium	Jan-Dec	---	---	---	---	None	
Oteen----------------------	C	Medium	Jan-Dec	---	---	---	---	None	
Mars Hill------------------	B	Low	Jan-Dec	---	---	---	---	None	

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	D
				Ft	Ft	Ft			
WaD2:									
Walnut	B	High	Jan-Dec	---	---	---	---	None	
Oteen	C	High	Jan-Dec	---	---	---	---	None	
Mars Hill	B	Medium	Jan-Dec	---	---	---	---	None	
WaE2:									
Walnut	B	High	Jan-Dec	---	---	---	---	None	
Oteen	C	High	Jan-Dec	---	---	---	---	None	
Mars Hill	B	Medium	Jan-Dec	---	---	---	---	None	
WnF:									
Walnut	B	High	Jan-Dec	---	---	---	---	None	
Oteen	C	High	Jan-Dec	---	---	---	---	None	
Rock outcrop	D	Very high	Jan-Dec	---	---	---	---	None	
WoE:									
Wayah	B	Medium	Jan-Dec	---	---	---	---	None	
Burton	B	Very high	Jan-Dec	---	---	---	---	None	
WpF:									
Wayah	B	Medium	Jan-Dec	---	---	---	---	None	
Burton	B	Very high	Jan-Dec	---	---	---	---	None	
WrC:									
Wayah	B	Low	Jan-Dec	---	---	---	---	None	
Burton	B	Very high	Jan-Dec	---	---	---	---	None	
WrD:									
Wayah	B	Medium	Jan-Dec	---	---	---	---	None	
Burton	B	Very high	Jan-Dec	---	---	---	---	None	
WrE:									
Wayah	B	Medium	Jan-Dec	---	---	---	---	None	
Burton	B	Very high	Jan-Dec	---	---	---	---	None	

Table 18.—Water Features—Continued

Map symbol and soil name	Hydro-logic group	Surface runoff	Month	Water table		Ponding		
				Upper limit	Lower limit	Surface water depth	Duration	Frequency
				Ft	Ft	Ft		
WsF:								
Wayah	B	Medium	Jan-Dec	---	---	---	---	None
Burton	B	Very high	Jan-Dec	---	---	---	---	None
WtB:								
Whiteside	B	Medium	Jan-May	2.0-3.0	>6.0	---	---	None
			Jun-Nov	2.0-3.5	>6.0	---	---	None
			Dec	2.0-3.0	>6.0	---	---	None
WtC:								
Whiteside	B	Medium	Jan-May	2.0-3.0	>6.0	---	---	None
			Jun-Nov	2.0-3.5	>6.0	---	---	None
			Dec	2.0-3.0	>6.0	---	---	None
ZcB:								
Zillicoa	C	High	Jan-Dec	---	---	---	---	None
ZcC:								
Zillicoa	C	High	Jan-Dec	---	---	---	---	None
ZoD:								
Zillicoa	C	Very high	Jan-Dec	---	---	---	---	None

Table 19.—Taxonomic Classification of the Soils

Soil name	Family or higher taxonomic class
Ashe	Coarse-loamy, mixed, active, mesic Typic Dystrudepts
Balsam	Loamy-skeletal, isotic, frigid Humic Dystrudepts
Biltmore	Mixed, mesic Typic Udipsamments
Braddock	Fine, mixed, semiactive, mesic Typic Hapludults
Brasstown	Fine-loamy, mixed, subactive, mesic Typic Hapludults
Breakneck	Fine-loamy, isotic, frigid Humic Dystrudepts
Brownwood	Coarse-loamy, paramicaceous, mesic Typic Dystrudepts
Burton	Fine-loamy, isotic, frigid Humic Dystrudepts
Cataloochee	Fine-loamy, isotic, frigid Humic Dystrudepts
Cataska	Loamy-skeletal, mixed, semiactive, mesic, shallow Typic Dystrudepts
Cheoah	Fine-loamy, isotic, mesic Humic Dystrudepts
Chestnut	Coarse-loamy, mixed, active, mesic Typic Dystrudepts
Chiltoskie	Fine-loamy, isotic, frigid Typic Dystrudepts
Cleveland	Loamy, mixed, active, mesic Lithic Dystrudepts
Clifton	Fine, mixed, semiactive, mesic Typic Hapludults
Clingman	Dysic, frigid Lithic Udifolists
Cowee	Fine-loamy, parasesquic, mesic Typic Hapludults
Craggey	Loamy, isotic, frigid Humic Lithic Dystrudepts
Dellwood	Sandy-skeletal, mixed, mesic Oxyaquic Dystrudepts
Dillard	Fine-loamy, mixed, semiactive, mesic Aquic Hapludults
Edneyville	Coarse-loamy, mixed, active, mesic Typic Dystrudepts
Evard	Fine-loamy, parasesquic, mesic Typic Hapludults
Fannin	Fine-loamy, paramicaceous, mesic Typic Hapludults
French	Fine-loamy over sandy or sandy-skeletal, mixed, active, mesic Fluvaquentic Dystrudepts
Guyot	Fine-loamy, isotic, frigid Humic Dystrudepts
Heintooga	Loamy-skeletal, isotic, frigid Humic Dystrudepts
Hemphill	Fine, mixed, active, mesic Umbric Endoaqualfs
Iotla	Coarse-loamy, mixed, active, mesic Fluvaquentic Dystrudepts
Jeffrey	Fine-loamy, isotic, mesic Humic Dystrudepts
Junaluska	Fine-loamy, mixed, subactive, mesic Typic Hapludults
Kanuga	Fine, mixed, semiactive, mesic Aquic Hapludults
Lauada	Fine-loamy, micaceous, mesic Typic Hapludults
Mars Hill	Coarse-loamy, mixed, superactive, mesic Dystric Eutrudepts
Maymead	Coarse-loamy, mixed, semiactive, mesic Typic Dystrudepts
Micaville	Coarse-loamy, micaceous, mesic Typic Dystrudepts
Nikwasi	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid, mesic Cumulic Humaquepts
Northcove	Loamy-skeletal, mixed, semiactive, mesic Typic Dystrudepts
Oconaluftee	Fine-loamy, isotic, frigid Humic Dystrudepts
Oteen	Loamy, mixed, superactive, mesic, shallow Dystric Eutrudepts
Porters	Fine-loamy, isotic, mesic Typic Dystrudepts
Pullback	Loamy, isotic, frigid Humic Lithic Dystrudepts
Reddies	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Oxyaquic Dystrudepts
Rosman	Coarse-loamy, mixed, superactive, mesic Fluventic Humic Dystrudepts
Soco	Coarse-loamy, mixed, active, mesic Typic Dystrudepts
Statler	Fine-loamy, mixed, active, mesic Humic Hapludults
Stecoah	Coarse-loamy, mixed, active, mesic Typic Dystrudepts
Swannanoa	Fine, mixed, semiactive, mesic Typic Umbraquults
Sylco	Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
Tanasee	Fine-loamy, isotic, frigid Humic Dystrudepts
Tate	Fine-loamy, mixed, semiactive, mesic Typic Hapludults
Toecane	Loamy-skeletal, mixed, active, mesic Humic Hapludults
Toxaway	Fine-loamy, mixed, superactive, nonacid, mesic Cumulic Humaquepts
Trimont	Fine-loamy, mixed, active, mesic Humic Hapludults
Tusquitee	Fine-loamy, isotic, mesic Typic Dystrudepts
Udifluvents	Udifluvents
Udorthents	Udorthents

Table 19.—Taxonomic Classification of the Soils—Continued

Soil name	Family or higher taxonomic class
Unaka	Fine-loamy, isotic, mesic Typic Dystrudepts
Unison	Fine, mixed, semiactive, mesic Typic Hapludults
Walnut	Coarse-loamy, mixed, superactive, mesic Dystric Eutrudepts
Wayah	Fine-loamy, isotic, frigid Humic Dystrudepts
Whiteside	Fine-loamy, mixed, active, mesic Aquic Hapludults
Zillicoa	Fine, mixed, active, mesic Vertic Hapludalfs

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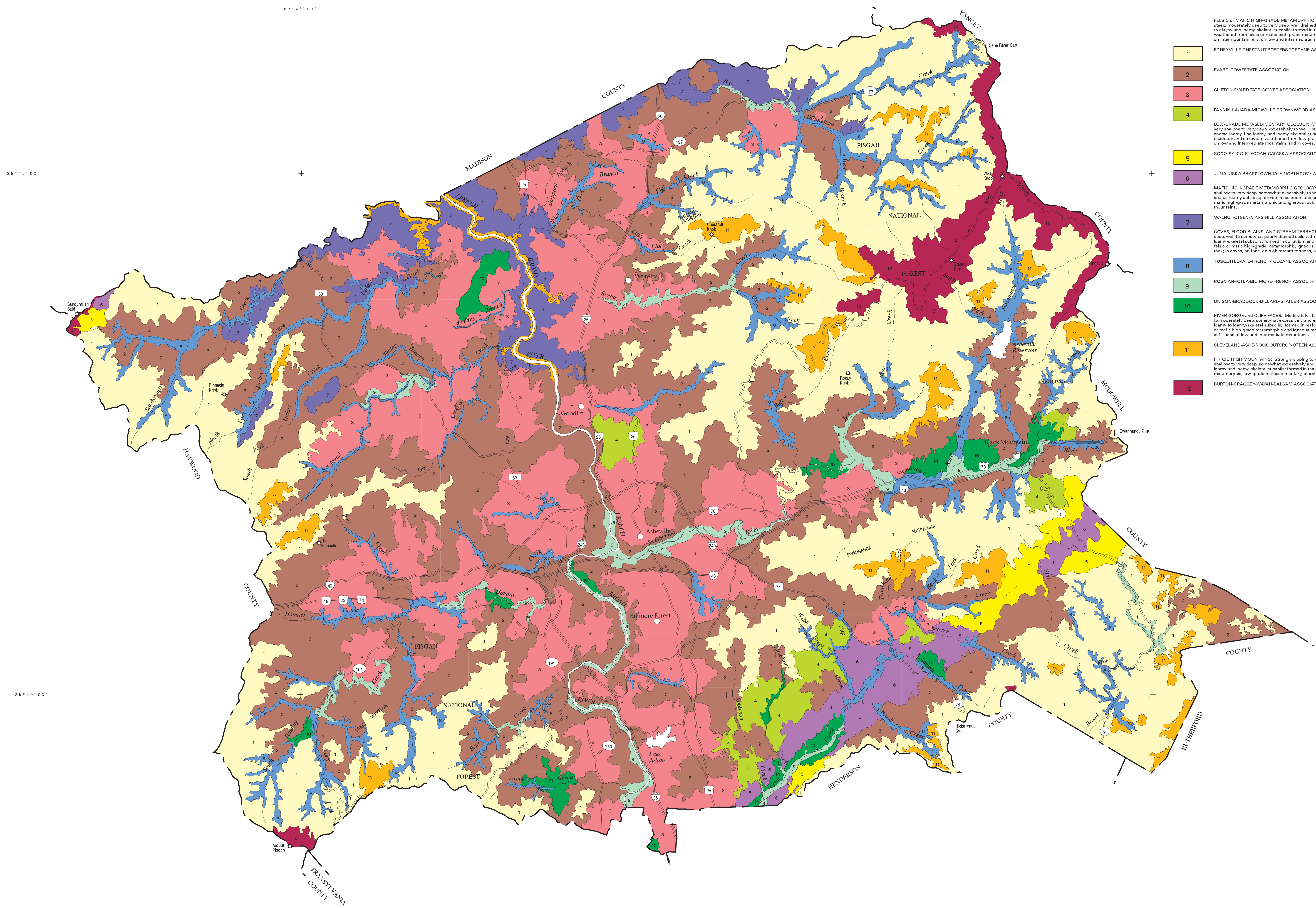


LEGEND

FELSIC or MAFIC HIGH-GRADE METAMORPHIC GEOLOGY: Gently sloping to very steep, moderately deep to very deep, well drained soils with coarse-loamy to clayey and loamy-skeletal subsoils; formed in residuum and colluvium weathered from felsic or mafic high-grade metamorphic and igneous rock; on intermountain hills, on low and intermediate mountains, and in coves.

1 EDNEYVILLE-CHESTNUT-PORTERS-TOECANE ASSOCIATION

2 EVARD-COWEE-TATE ASSOCIATION

3 CLIFTON-EVARD-TATE-COWEE ASSOCIATION

4 FANNIN-LAUADA-MICAVILLE-BROWNWOOD ASSOCIATION

LOW-GRADE METASEDIMENTARY GEOLOGY: Moderately steep to very steep, very shallow to very deep, excessively to well drained soils with coarse-loamy, fine-loamy, and loamy-skeletal subsoils; formed in residuum and colluvium weathered from low-grade metasedimentary rock; on low and intermediate mountains and in coves.

5 SOCO-SYLCO-STECOAH-CATASKA ASSOCIATION

6 JUNALUSKA-BRASSTOWN-TATE-NORTHCOVE ASSOCIATION

MAFIC HIGH-GRADE METAMORPHIC GEOLOGY: Strongly sloping to very steep, shallow to very deep, somewhat excessively to well drained soils with coarse-loamy subsoils; formed in residuum and colluvium weathered from mafic high-grade metamorphic and igneous rock; on low and intermediate mountains.

7 WALNUT-OTEEN-MARS HILL ASSOCIATION

COVES, FLOOD PLAINS, AND STREAM TERRACES: Nearly level to steep, very deep, well to somewhat poorly drained soils with sandy to clayey and loamy-skeletal subsoils; formed in colluvium and alluvium derived from felsic or mafic high-grade metamorphic, igneous, and low-grade metasedimentary rock; in coves, on fans, on high stream terraces, and on flood plains.

8 TUSQUITEE-TATE-FRENCH-TOECANE ASSOCIATION

9 ROSMAN-IOTLA-BILTMORE-FRENCH ASSOCIATION

10 UNISON-BRADDOCK-DILLARD-STATLER ASSOCIATION

RIVER GORGE and CLIFF FACES: Moderately steep to very steep, very shallow to moderately deep, somewhat excessively and excessively drained soils with loamy to loamy-skeletal subsoils; formed in residuum weathered from felsic or mafic high-grade metamorphic and igneous rock; in river gorges and on cliff faces of low and intermediate mountains.

11 CLEVELAND-ASHE-ROCK OUTCROP-OTEEN ASSOCIATION

FIRIGID HIGH MOUNTAINS: Strongly sloping to very steep, shallow to very deep, somewhat excessively and well drained soils with coarse-loamy and loamy-skeletal subsoils; formed in residuum weathered from high-grade metamorphic, low-grade metasedimentary, or igneous rock; on high mountains.

12 BURTON-CRAGGEY-WAYAH-BALSAM ASSOCIATION

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA COOPERATIVE EXTENSION SERVICE
BUNCOMBE SOIL AND WATER CONSERVATION DISTRICT
BUNCOMBE COUNTY BOARD OF COMMISSIONERS

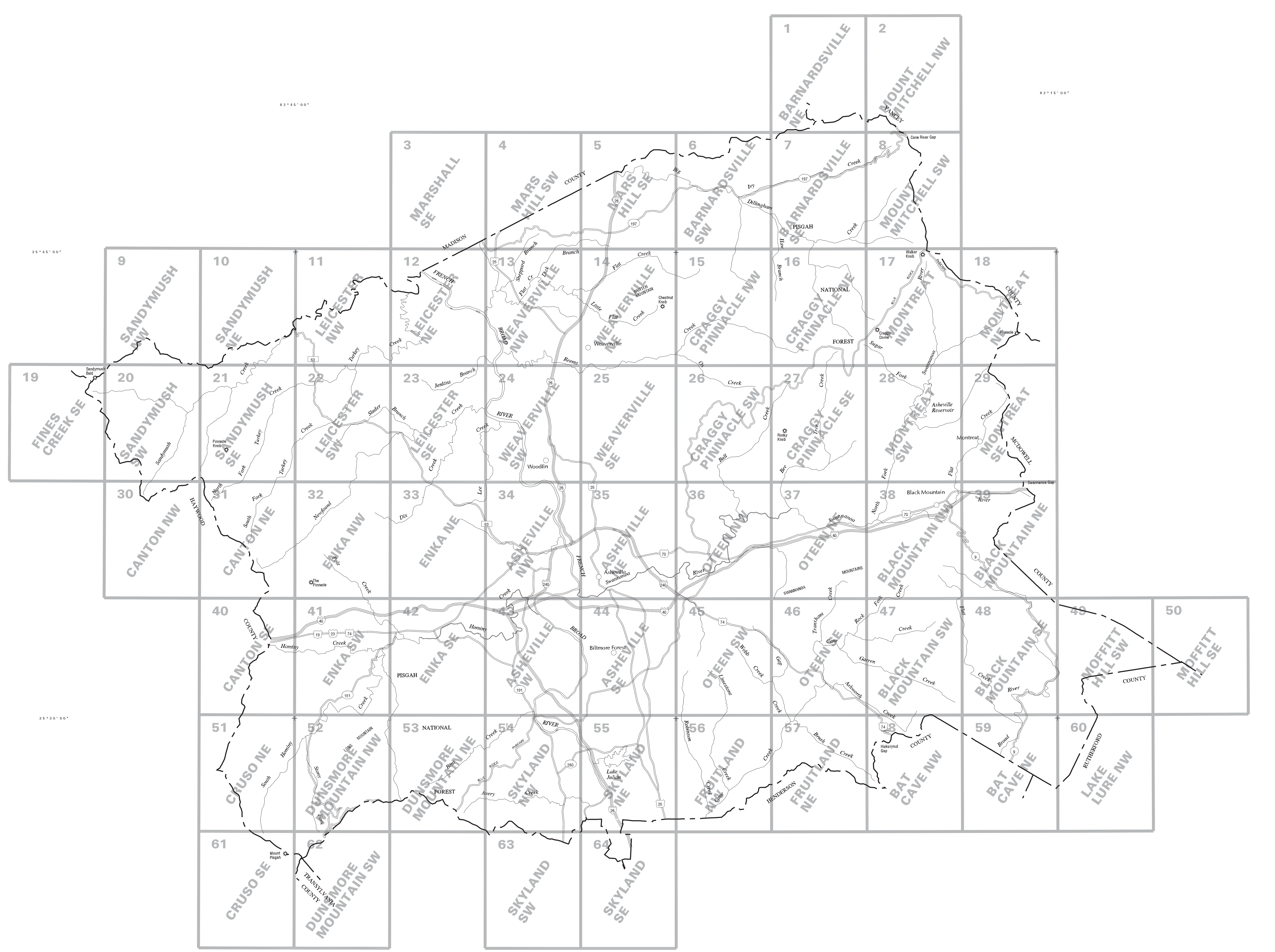
GENERAL SOIL MAP
BUNCOMBE COUNTY, NORTH CAROLINA

1 0 1 2 3
MILES

1 0 1 2 3 4 5 6
KILOMETERS

SCALE = 1:120000

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS
BUNCOMBE COUNTY, NORTH CAROLINA

MILES
KILOMETERS
SCALE = 1:120000

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT
AND NATURAL RESOURCES

DIVISION OF LAND RESOURCES
GEOLOGICAL SURVEY SECTION

BEDROCK GEOLOGIC MAP OF BUNCOMBE COUNTY, NORTH CAROLINA

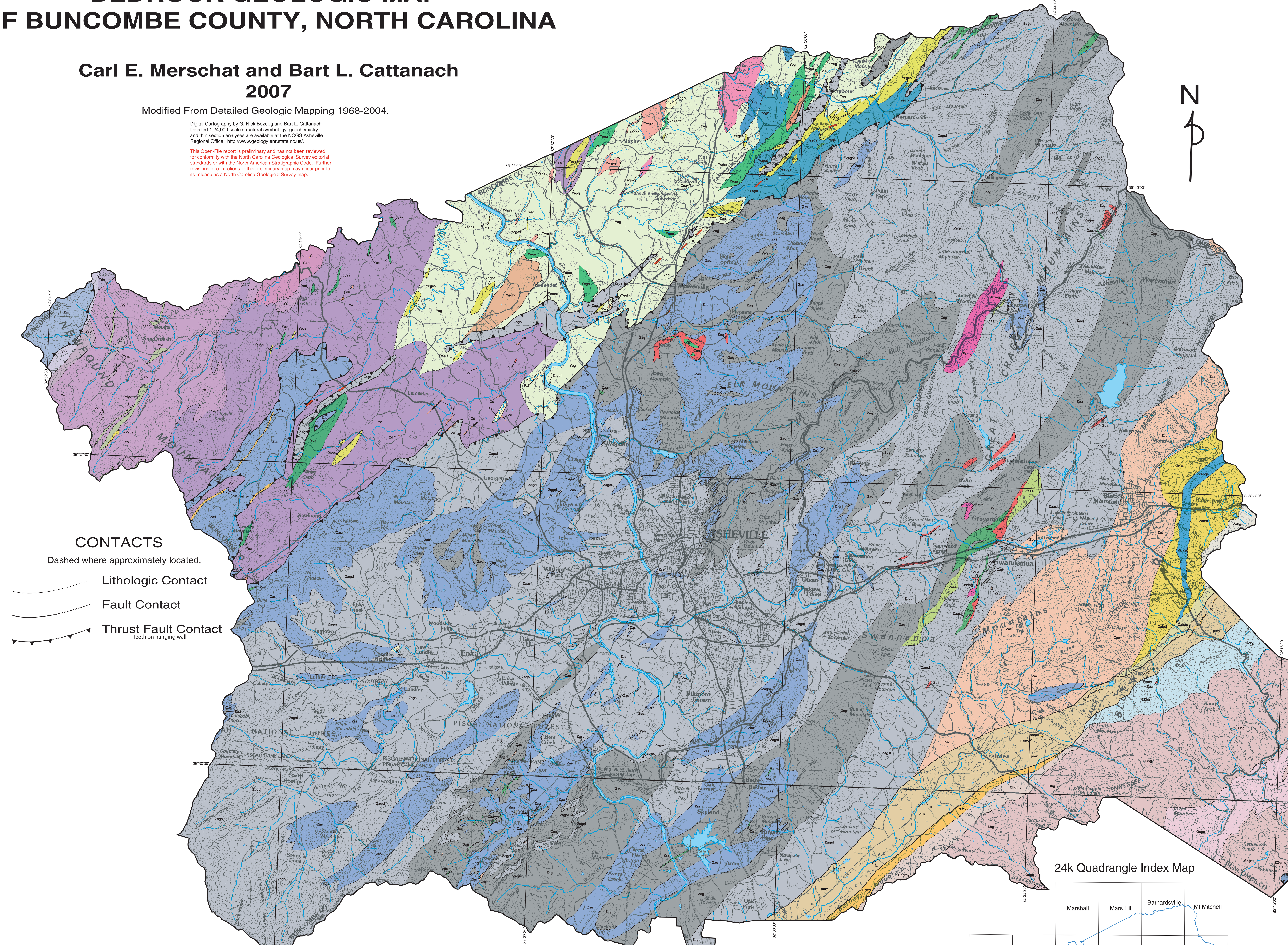
Carl E. Merschat and Bart L. Cattanach

2007

Modified From Detailed Geologic Mapping 1968-2004.

Digital Cartography by G. Nick Bozdog and Bart L. Cattanach
Detailed 1:24,000 scale structural symbology, geochemistry, and thin section analyses are available at the NCGS Asheville Regional Office: http://www.geology.enr.state.nc.us/.

This Open-File report is preliminary and has not been reviewed for conformity with the North Carolina Geological Survey editorial standards or with the North American Stratigraphic Code. Further revisions or corrections to this preliminary map may occur prior to its release as a North Carolina Geological Survey map.



MAP UNITS

Cataclastic and Mylonitic Rocks

- u — ultramylonite
- Pzmy — sericitic mylonite

Paleozoic Intrusive Rocks

- Pzt — trondhjemite
- Pzmg — migmatitic gneiss
- Osgg — biotite orthogranitic gneiss
- Єhg — Henderson augen gneiss
- Єhgmy — Henderson augen gneiss, mylonitic

PALEOZOIC

Metamorphic Rocks

Brevard Zone Rocks

- pmy — phyllonite/mylonite
- m — marble

Inner Piedmont Rocks

- ЄZbg — biotite gneiss
- ЄZgms — garnet mica schist

Ocoee Supergroup

Great Smoky Group

- Zchk — **Copper Hill Formation** kyanite-garnet-mica schist

Unconformity

- Zd — dunite body
- Zua — altered ultramafic body
- Zg — hornblende metagabbro

stratigraphic relations uncertain

Alligator Back Metamorphic Suite

- Zabg — metagraywacke
- Zabgp — protomylonitic gneiss
- Zabgs — gaphitic schist
- Zabsi — schistose metagraywacke

stratigraphic relations uncertain

Ashe Metamorphic Suite/Tallulah Falls Formation

- Zag — metagraywacke
- Zas — garnet-mica schist
- Zagsi — schistose metagraywacke
- Zaa — amphibolite
- Zac — metaconglomerate
- Zasc — chloritoid bearing schist
- Zagg — gneissic metagraywacke
- Zass — sillimanite/kyanite schist

stratigraphic relations uncertain

Crossnore Plutonic Volcanic Suite

- Zbg — **Bakersville Metagabbro**

LATE PROTEROZOIC

Basement Complex

- Yua — altered ultramafic
- Ydg — **Doggett Gap** protomylonitic granitoid gneiss
- Ysc — **Spring Creek Granitoid Gneiss**

Sandymush Felsic Gneiss (Ys)

- Ys, Ysp — protomylonitic (Ysp)
- Yscs — calc-silicate granofels (Yscs)
- Ysa — amphibolite (Ysa)

Sandymush Mafic Gneiss (Ysm)

- Ysm, Ysa — amphibolite (Ysa)

Earlies Gap Biotite Gneiss (Ye)

- Ye, Yepg — pyoxene granulite (Yepg)
- Yecs — calc-silicate granofels (Yecs)
- Yea — amphibolite (Yea)

Earlies Gap Granulitic Gneisses (Yeg)

- Yeg, Yegp — granulitic gneisses protmylonitic (Yegp)
- Yega — amphibolite (Yega)
- Yegb — biotite gneiss (Yegb)
- Yegcs — calc-silicate granofels (Yegcs)
- Yeghg — garnet hornblende granofels (Yeghg)
- Yegm — magnetite biotite granitic gneiss (Yegm)
- Yegqc — granulitic quartz-clinozoisite gneiss (Yegqc)
- Yegpg — pyroxene granulite (Yegpg)
- Yegmg — mafic granulite (Yegmg)

MIDDLE PROTEROZOIC

CONTACTS

Dashed where approximately located.

- Lithologic Contact
- Fault Contact
- Thrust Fault Contact (Teeth on hanging wall)

SCALE 1:62,500

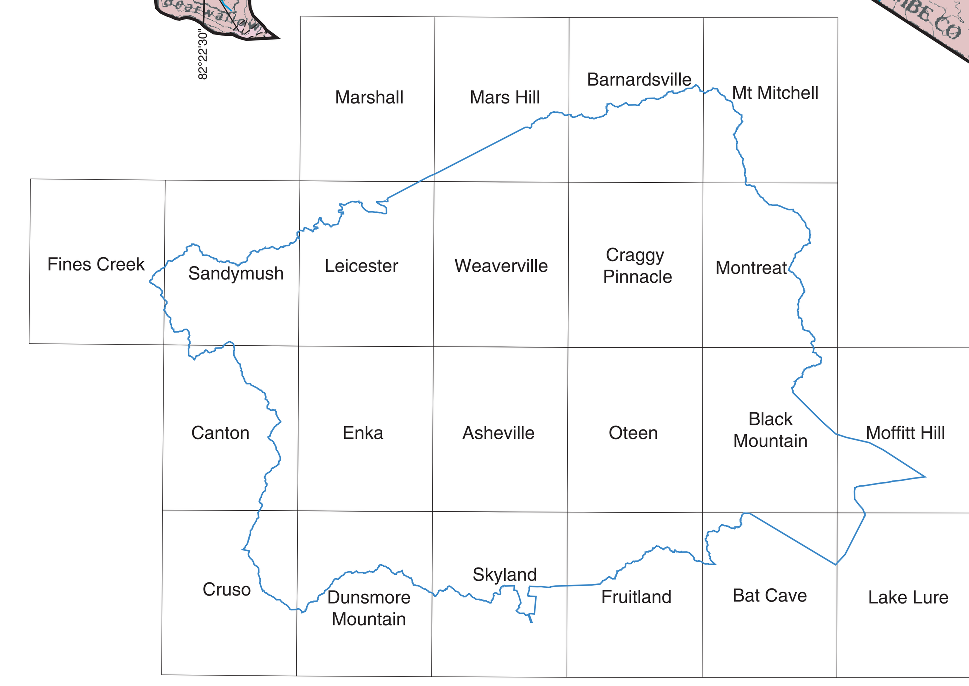
Kilometers 1 0 1 2 3 4 5 6 7 8 9 10

Miles 1 0 1 2 3 4 5 6 7

CONTOUR INTERVAL 50 METERS
BASE MAP IS FROM PARTS OF THE ASHEVILLE AND HENDERSONVILLE 1:100, 000 USGS TOPOGRAPHIC MAPS

County Location

24k Quadrangle Index Map



UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
BUNCOMBE SOIL AND WATER CONSERVATION DISTRICT
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA COOPERATIVE EXTENSION SERVICE
BUNCOMBE COUNTY BOARD OF COMMISSIONERS

BUNCOMBE COUNTY, NORTH CAROLINA

ND

s consist of letters. The first letter is capitalized and is the or miscellaneous area). The second letter is lowercase. er 2 at the end indicates a moderately eroded phase.

YMBOL	NAME
MwF	Micaville-Brownwood complex, 50 to 95 percent slopes, stony
NkA	Nikwasi loam, 0 to 2 percent slopes, frequently flooded
NtD	Northcove-Maymead complex, 15 to 30 percent slopes, very stony
NtE	Northcove-Maymead complex, 30 to 50 percent slopes, very stony
OwC	Oconaluftee-Guyot-Cataloochee complex, windswept, 8 to 15 percent slopes, bouldery
OwD	Oconaluftee-Guyot-Cataloochee complex, windswept, 15 to 30 percent slopes, bouldery
OwE	Oconaluftee-Guyot-Cataloochee complex, windswept, 30 to 50 percent slopes, bouldery
OwF	Oconaluftee-Guyot-Cataloochee complex, windswept, 50 to 95 percent slopes, bouldery
Pg	Pits, gravel, occasionally flooded
Pt	Pits, quarry
PwC	Porters-Unaka complex, 8 to 15 percent slopes, stony
PwD	Porters-Unaka complex, 15 to 30 percent slopes, stony
PwE	Porters-Unaka complex, 30 to 50 percent slopes, stony
PxF	Porters-Unaka complex, 50 to 95 percent slopes, rocky
RdA	Reddies sandy loam, 0 to 3 percent slopes, occasionally flooded
RkF	Rock outcrop-Cleveland complex, 30 to 95 percent slopes, very bouldery
RoF	Rock outcrop-Oteen complex, 30 to 95 percent slopes, very bouldery
RsA	Rosman fine sandy loam, 0 to 3 percent slopes, occasionally flooded
SoD	Soco-Stecoah complex, 15 to 30 percent slopes, stony
SoE	Soco-Stecoah complex, 30 to 50 percent slopes, stony
SoF	Soco-Stecoah complex, 50 to 95 percent slopes, stony
StB	Statler loam, 1 to 5 percent slopes, rarely flooded
SyD	Sylco-Soco complex, 15 to 30 percent slopes, stony
SyE	Sylco-Soco complex, 30 to 50 percent slopes, stony
SzF	Sylco-Soco complex, 50 to 95 percent slopes, very stony
TaB	Tate loam, 2 to 8 percent slopes
TaC	Tate loam, 8 to 15 percent slopes
TaD	Tate loam, 15 to 30 percent slopes
TkC	Tate loam, 8 to 15 percent slopes, very stony
TkD	Tate loam, 15 to 30 percent slopes, very stony
TmB	Tate-Urban land complex, 2 to 8 percent slopes
TmC	Tate-Urban land complex, 8 to 15 percent slopes
TmD	Tate-Urban land complex, 15 to 30 percent slopes
TnE	Toecane very cobbly loam, 30 to 50 percent slopes, extremely bouldery
ToC	Toecane-Tusquitee complex, 8 to 15 percent slopes, bouldery
TpD	Toecane-Tusquitee complex, 15 to 30 percent slopes, very bouldery
TpE	Toecane-Tusquitee complex, 30 to 50 percent slopes, very bouldery
TsA	Toxaway loam, 0 to 2 percent slopes, frequently flooded
TtE	Trimont loam, 30 to 50 percent slopes, stony
TuD	Tusquitee-Toecane complex, 15 to 30 percent slopes, stony
TwB	Tusquitee-Whiteside complex, 2 to 8 percent slopes
TwC	Tusquitee-Whiteside complex, 8 to 15 percent slopes
UcB	Udifluvents, sandy, 0 to 5 percent slopes, frequently flooded
Ud	Udorthents, loamy
UfB	Udorthents-Urban land complex, 0 to 5 percent slopes, occasionally flooded
UhE	Udorthents-Urban land complex, 2 to 50 percent slopes
UkD	Unaka-Rock outcrop complex, 15 to 30 percent slopes, very bouldery
UkE	Unaka-Rock outcrop complex, 30 to 50 percent slopes, very bouldery
UkF	Unaka-Rock outcrop complex, 50 to 95 percent slopes, very bouldery
UnB	Unison loam, 2 to 8 percent slopes
UnC	Unison loam, 8 to 15 percent slopes
UnD	Unison loam, 15 to 30 percent slopes
UrB	Unison-Urban land complex, 2 to 8 percent slopes
UrC	Unison-Urban land complex, 8 to 15 percent slopes
Ux	Urban land
W	Water
WaC2	Walnut-Oteen-Mars Hill complex, 8 to 15 percent slopes, moderately eroded
WaD2	Walnut-Oteen-Mars Hill complex, 15 to 30 percent slopes, moderately eroded
WaE2	Walnut-Oteen-Mars Hill complex, 30 to 50 percent slopes, moderately eroded
WnF	Walnut-Oteen-Rock outcrop complex, 50 to 95 percent slopes
WoE	Wayah-Burton complex, 30 to 50 percent slopes, bouldery
WpF	Wayah-Burton complex, 50 to 95 percent slopes, very rocky
WrC	Wayah-Burton complex, windswept, 8 to 15 percent slopes, bouldery
WrD	Wayah-Burton complex, windswept, 15 to 30 percent slopes, bouldery
WrE	Wayah-Burton complex, windswept, 30 to 50 percent slopes, bouldery
WsF	Wayah-Burton complex, windswept, 50 to 95 percent slopes, very rocky
WtB	Whiteside loam, 2 to 8 percent slopes
WtC	Whiteside loam, 8 to 15 percent slopes
ZcB	Zillicoa loam, 2 to 8 percent slopes
ZcC	Zillicoa loam, 8 to 15 percent slopes
ZoD	Zillicoa loam, 15 to 30 percent slopes, stony

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

SOIL SURVEY FEATURES

SOIL DELINEATIONS AND SYMBOLS AcD ChD

LANDFORM FEATURES

Mine or quarry

Rock outcrop

Sandy spot

Severely eroded spot

Short steep slope

Very stony spot

Wet spot

CULTURAL FEATURES

BOUNDARIES

National, state, or province

County or parish

Field sheet matchline & neatline

TRANSPORTATION

Divided road

Other road

ROAD EMBLEMS

Interstate 173

Federal 287

State 52

County 1283

U.S. Forest Service USFS1234

LOCATED OBJECTS

Cemetery

Church

School

Soil sample site

HYDROGRAPHIC FEATURES

Unclassified stream

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
BARNARDSVILLE NE QUADRANGLE
SHEET NUMBER 1 OF 64

82° 26′15″ 82° 22′30″

35° 52′30″ 35° 52′30″

35° 48′45″ 35° 48′45″

82° 26′15″ 82° 22′30″

Joins sheet 7, Barnardsville SE

Joins sheet 6, Barnardsville SW

Joins sheet 8, Mount Mitchell SW

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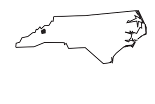
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



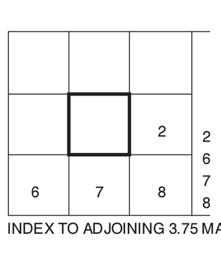
QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS



2 MOUNT MITCHELL NW
6 BARNARDSVILLE SW
7 BARNARDSVILLE SE
8 MOUNT MITCHELL SW

INDEX TO ADJOINING 3.75 MAPS

BARNARDSVILLE NE, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 1 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

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NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

9		11
20	21	22

9 SANDYMUSH NW
11 LEICESTER NW
20 SANDYMUSH SW
21 SANDYMUSH SE
22 LEICESTER SW

INDEX TO ADJOINING 3.75 MAPS

SANDYMUSH NE, NORTH CAROLINA

3.75 MINUTE SERIES

SHEET NUMBER 10 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
LEICESTER NW QUADRANGLE
SHEET NUMBER 11 OF 64

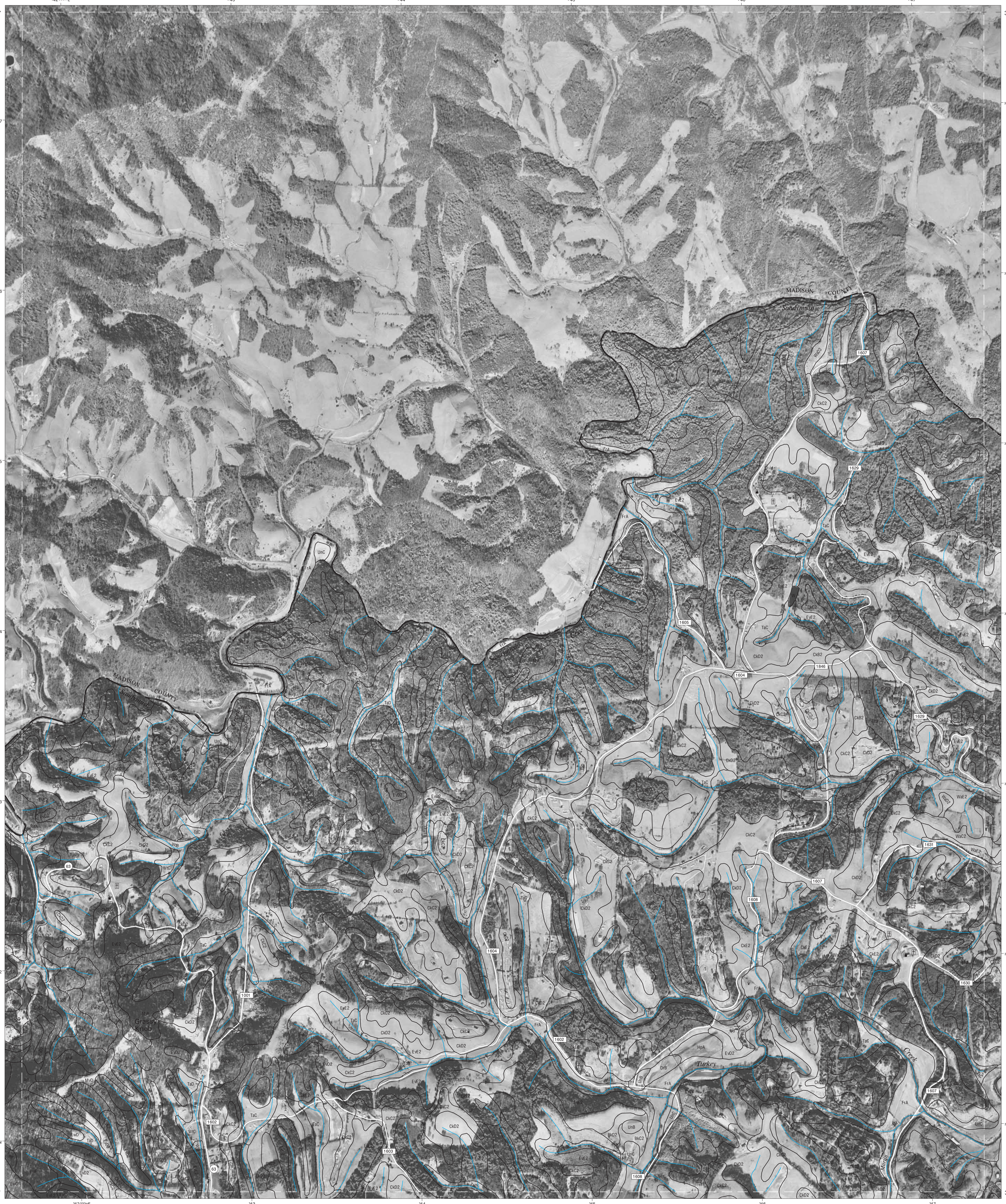
Joins sheet 3, Marshall SE

82° 45′00″ 82° 41′15″

35° 45′00″ 35° 41′15″

Joins sheet 10, Sandymush NE

Joins sheet 12, Leicester NE



Joins sheet 22, Leicester SW

Joins sheet 21, Sandymush SE

Joins sheet 23, Leicester SE

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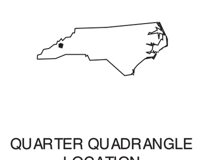
NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

		3
10		12
21	22	23

3 MARSHALL SE
10 SANDYMUSH NE
12 LEICESTER NE
21 SANDYMUSH SE
22 LEICESTER SW
23 LEICESTER SE

INDEX TO ADJOINING 3.75 MAPS

LEICESTER NW, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 11 OF 64

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UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
LEICESTER NE QUADRANGLE

Joins sheet 3, Marshall SE

Joins sheet 4, Mars Hill SW

Joins sheet 11, Leicester NW

Joins sheet 13, Weaverville NW

Joins sheet 22, Leicester SW

Joins sheet 23, Leicester SE

Joins sheet 24, Weaverville SW

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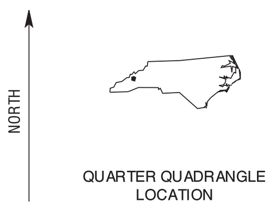
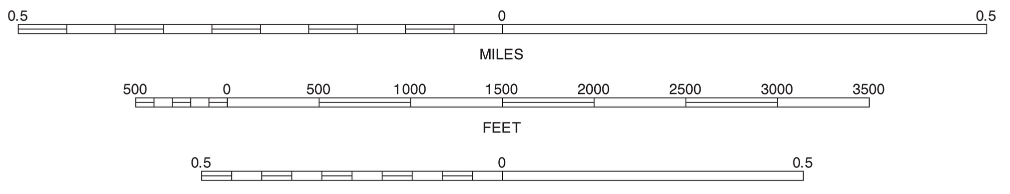


QUARTER QUADRANGLE LOCATION

SCALE 1:12000



	3	4
11		13
22	23	24

3 MARSHALL SE
4 MARS HILL SW
11 LEICESTER NW
13 WEAVERVILLE NW
22 LEICESTER SW
23 LEICESTER SE
24 WEAVERVILLE SW

INDEX TO ADJOINING 3.75 MAPS

LEICESTER NE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 12 OF 64

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UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
WEAVERVILLE NW QUADRANGLE
SHEET NUMBER 13 OF 64

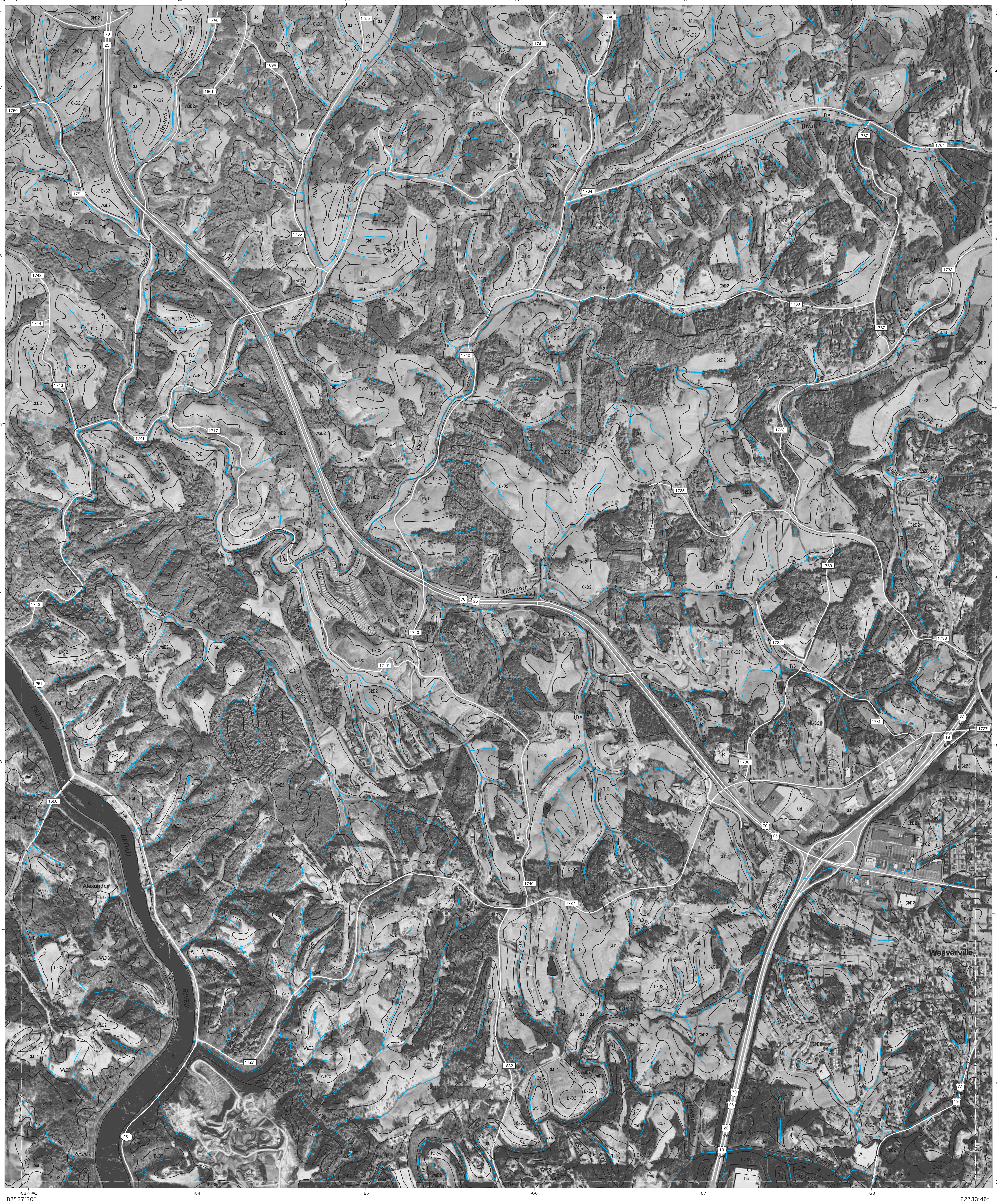
Joins sheet 3, Marshall SE

Joins sheet 4, Mars Hill SW

Joins sheet 5, Mars Hill SE

82° 37′30″ 82° 33′45″

35° 45′00″ 35° 45′00″



35° 41′15″ 35° 41′15″

82° 37′30″ 82° 33′45″

Joins sheet 12, Leicester NE

Joins sheet 14, Weaverville NE

Joins sheet 23, Leicester SE

Joins sheet 24, Weaverville SW

Joins sheet 25, Weaverville SE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

3	4	5
12		14
23	24	25

3 MARSHALL SE
4 MARS HILL SW
5 MARS HILL SE
12 LEICESTER NE
14 WEAVERVILLE NE
23 LEICESTER SE
24 WEAVERVILLE SW
25 WEAVERVILLE SE

INDEX TO ADJOINING 3.75 MAPS

WEAVERVILLE NW, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 13 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
WEAVERVILLE NE QUADRANGLE
SHEET NUMBER 14 OF 64

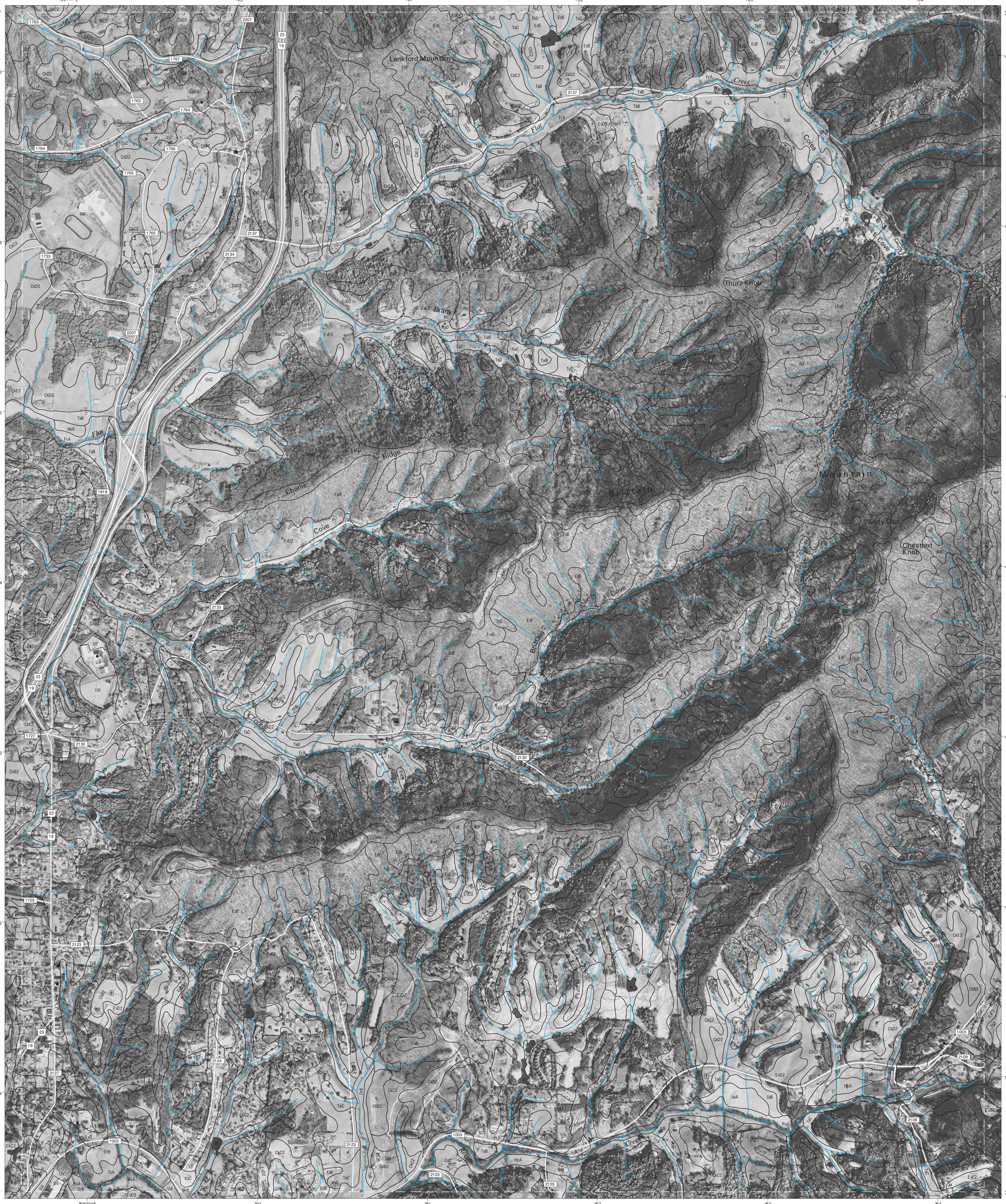
Joins sheet 4, Mars Hill SW

Joins sheet 5, Mars Hill SE

Joins sheet 6, Barnardsville SW

82° 33′45″ 82° 30′00″

35° 45′00″ 35° 45′00″



Joins sheet 13, Weaverville NW

Joins sheet 15, Craggy Pinnacle NW

35° 41′15″ 35° 41′15″

82° 33′45″ 82° 30′00″

Joins sheet 24, Weaverville SW

Joins sheet 25, Weaverville SE

Joins sheet 26, Craggy Pinnacle SW

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

4	5	6
13		15
24	25	26

4 MARS HILL SW
5 MARS HILL SE
6 BARNARDSVILLE SW
13 WEAVERVILLE NW
15 CRAGGY PINNACLE NW
24 WEAVERVILLE SW
25 WEAVERVILLE SE
26 CRAGGY PINNACLE SW

INDEX TO ADJOINING 3.75 MAPS

WEAVERVILLE NE, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 14 OF 64

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UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
CRAGGY PINNACLE NW QUADRANGLE
SHEET NUMBER 15 OF 64

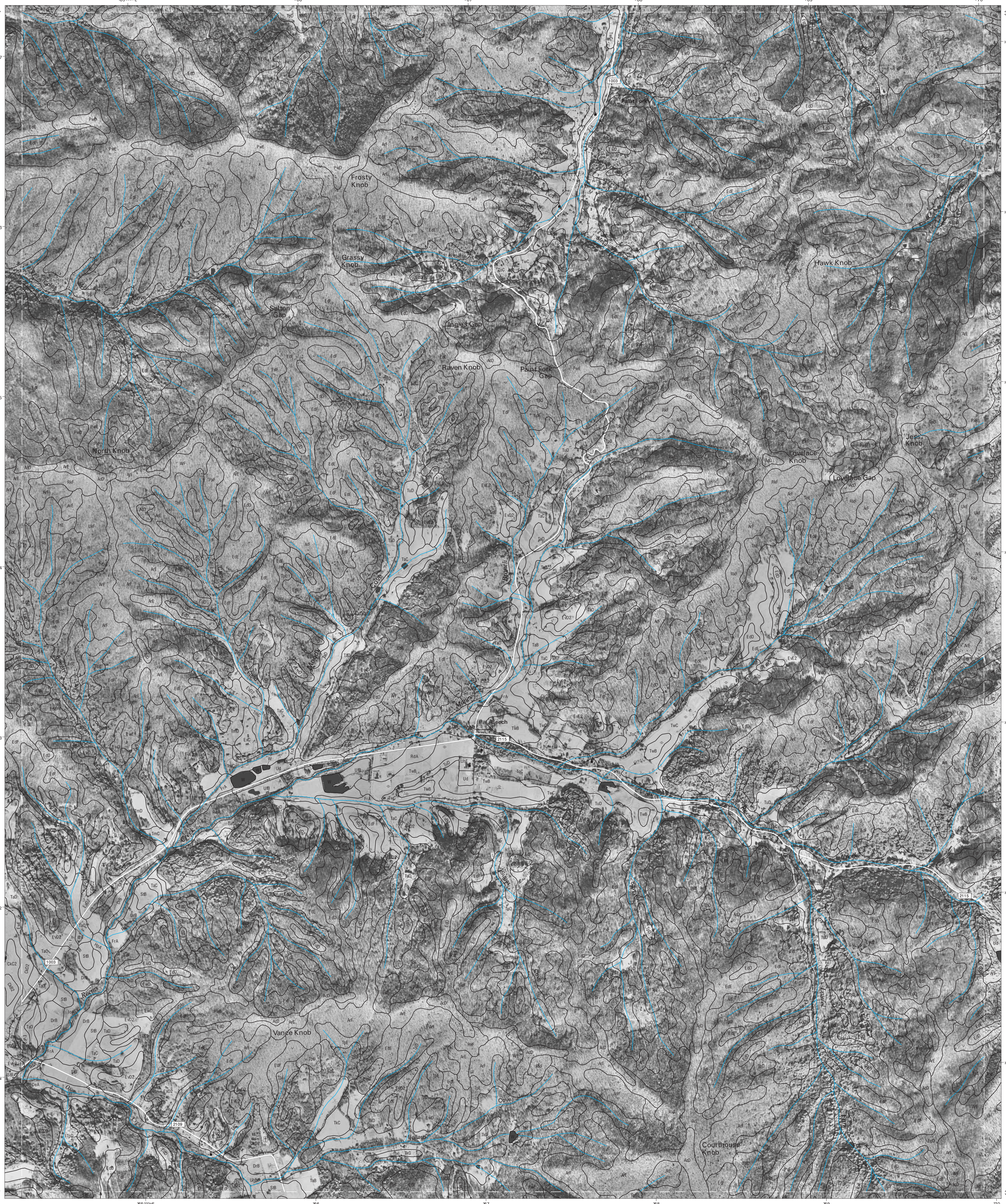
Joins sheet 5, Mars Hill SE

Joins sheet 6, Barnardsville SW

Joins sheet 7, Barnardsville SE

Joins sheet 14, Weaverville NE

Joins sheet 16, Craggy Pinnacle NE



Joins sheet 25, Weaverville SE

Joins sheet 26, Craggy Pinnacle SW

Joins sheet 27, Craggy Pinnacle SE

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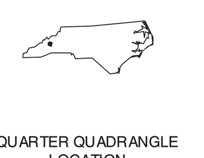
NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

5	6	7
14		16
25	26	27

5 MARS HILL SE
6 BARNARDSVILLE SW
7 BARNARDSVILLE SE
14 WEAVERVILLE NE
16 CRAGGY PINNACLE NE
25 WEAVERVILLE SE
26 CRAGGY PINNACLE SW
27 CRAGGY PINNACLE SE

INDEX TO ADJOINING 3.75 MAPS

CRAGGY PINNACLE NW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 15 OF 64

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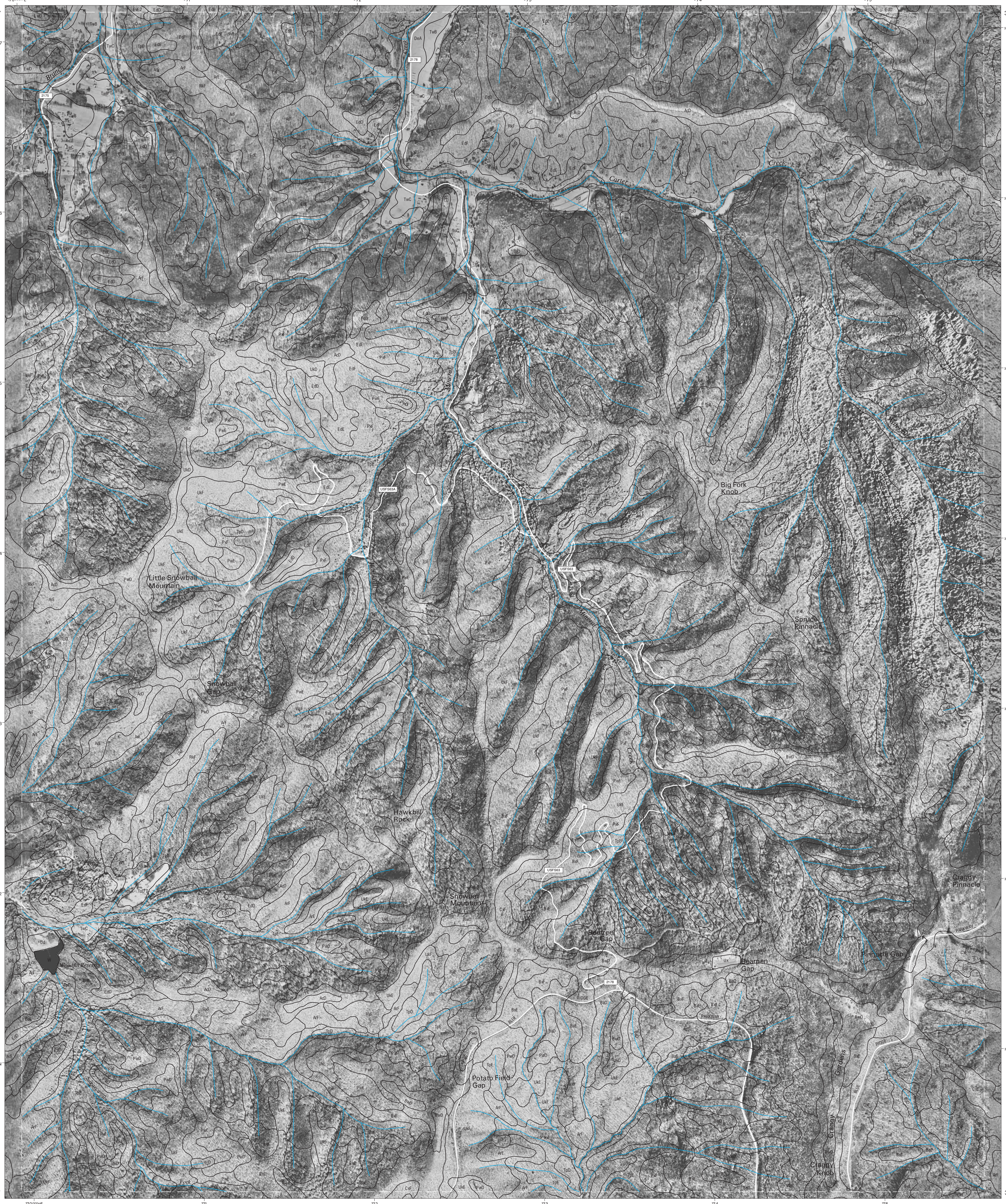
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
CRAGGY PINNACLE NE QUADRANGLE
SHEET NUMBER 16 OF 64



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5 MILES

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 0 0.5 KILOMETERS

6	7	8
15		17
26	27	28

6 BARNARDSVILLE SW
7 BARNARDSVILLE SE
8 MOUNT MITCHELL SW
15 CRAGGY PINNACLE NW
17 MONTREAT NW
26 CRAGGY PINNACLE SW
27 CRAGGY PINNACLE SE
28 MONTREAT SW

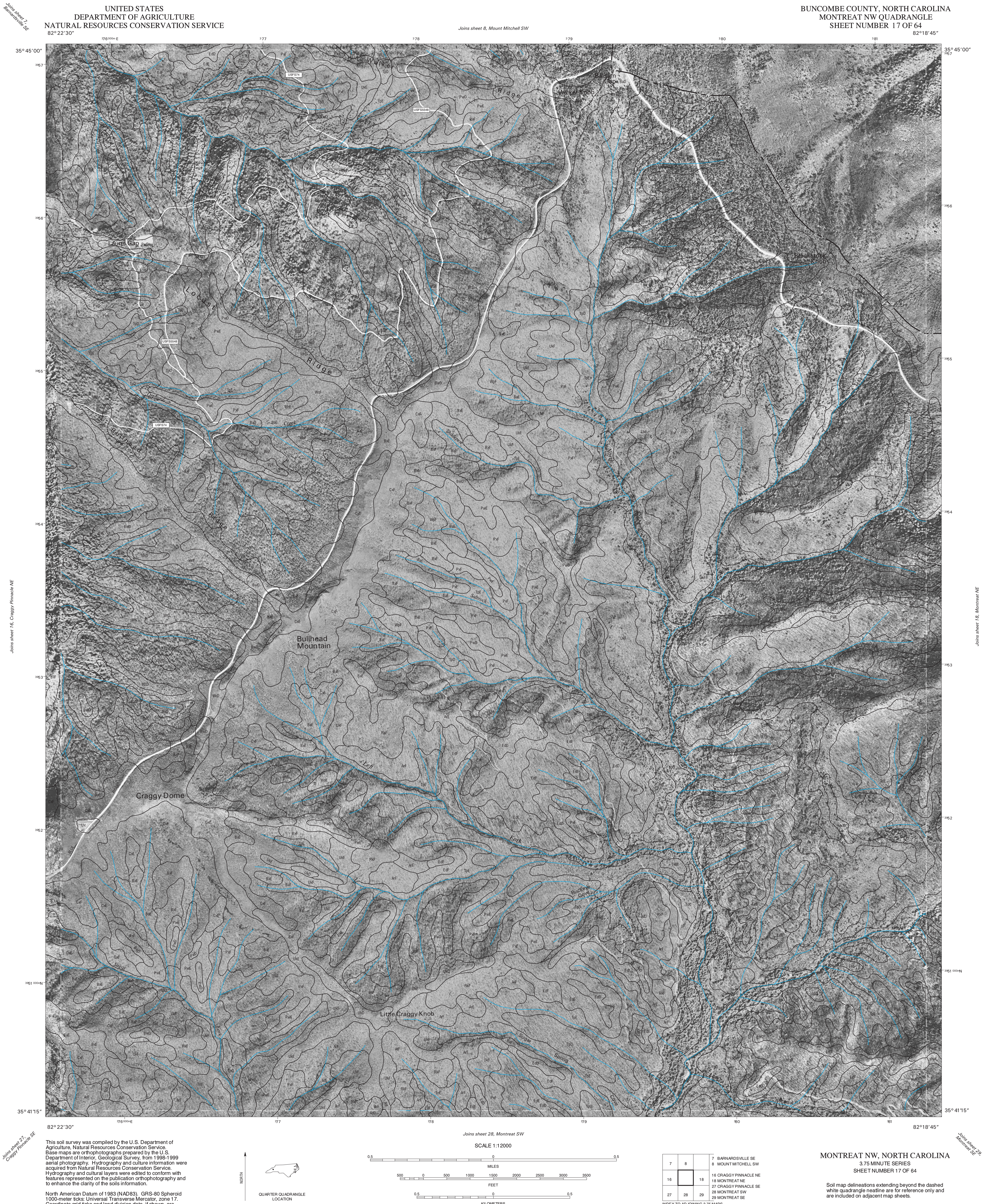
INDEX TO ADJOINING 3.75 MAPS

CRAGGY PINNACLE NE, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 16 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
MONTREAT NW QUADRANGLE
SHEET NUMBER 17 OF 64



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

7	8	
16		18
27	28	29

7 BARNARDSVILLE SE
8 MOUNT MITCHELL SW
16 CRAGGY PINNACLE NE
18 MONTREAT NE
27 CRAGGY PINNACLE SE
28 MONTREAT SW
29 MONTREAT SE

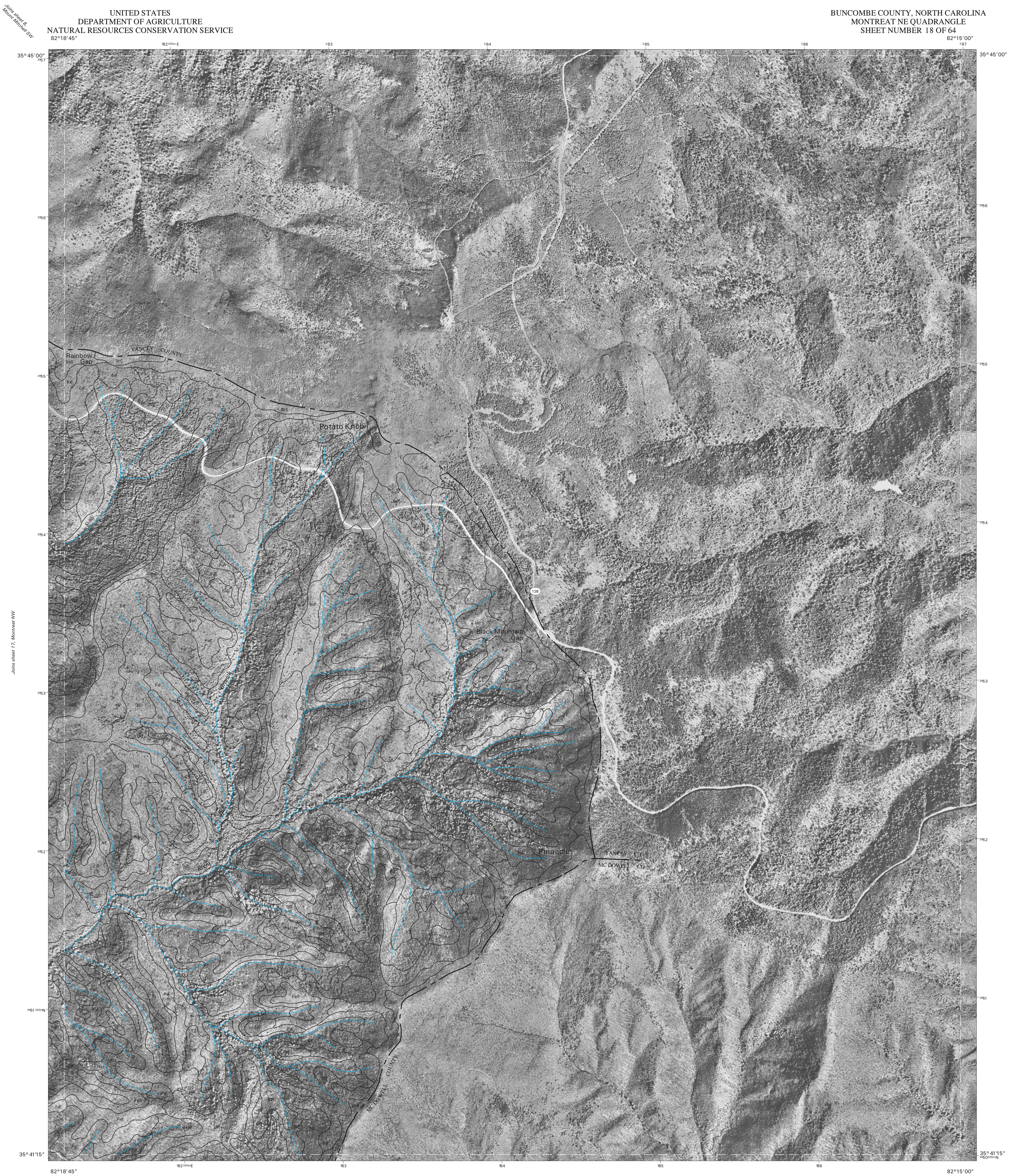
INDEX TO ADJOINING 3.75 MAPS

MONTREAT NW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 17 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
MONTREAT NE QUADRANGLE
SHEET NUMBER 18 OF 64



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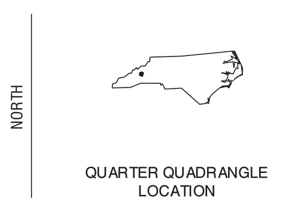
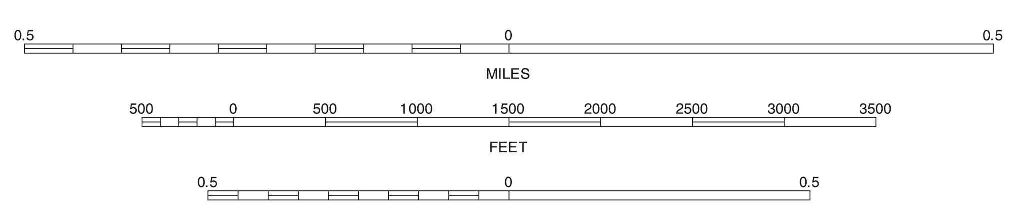
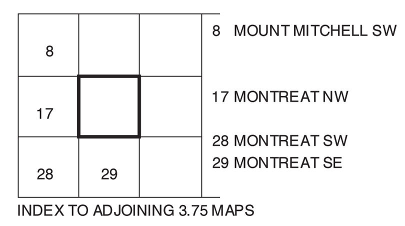
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.







MONTREAT NE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 18 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
FINES CREEK SE QUADRANGLE
SHEET NUMBER 19 OF 64

Joins sheet 9, Sandymush NW

82°56'15" 82°52'30"

35°41'15" 35°41'15"

35°37'30" 35°37'30"

82°56'15" 82°52'30"

Joins sheet 20, Sandymush SW

Joins sheet 30, Canton NW

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

9 SANDYMUSH NW
20 SANDYMUSH SW
30 CANTON NW

INDEX TO ADJOINING 3.75 MAPS

FINES CREEK SE, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 19 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
MOUNT MITCHELL NW QUADRANGLE
SHEET NUMBER 2 OF 64

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1998-1999 aerial photography. Hydrography and culture information were acquired from Natural Resources Conservation Service. Hydrography and cultural layers were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

1 BARNARDSVILLE NE
7 BARNARDSVILLE SE
8 MOUNT MITCHELL SW

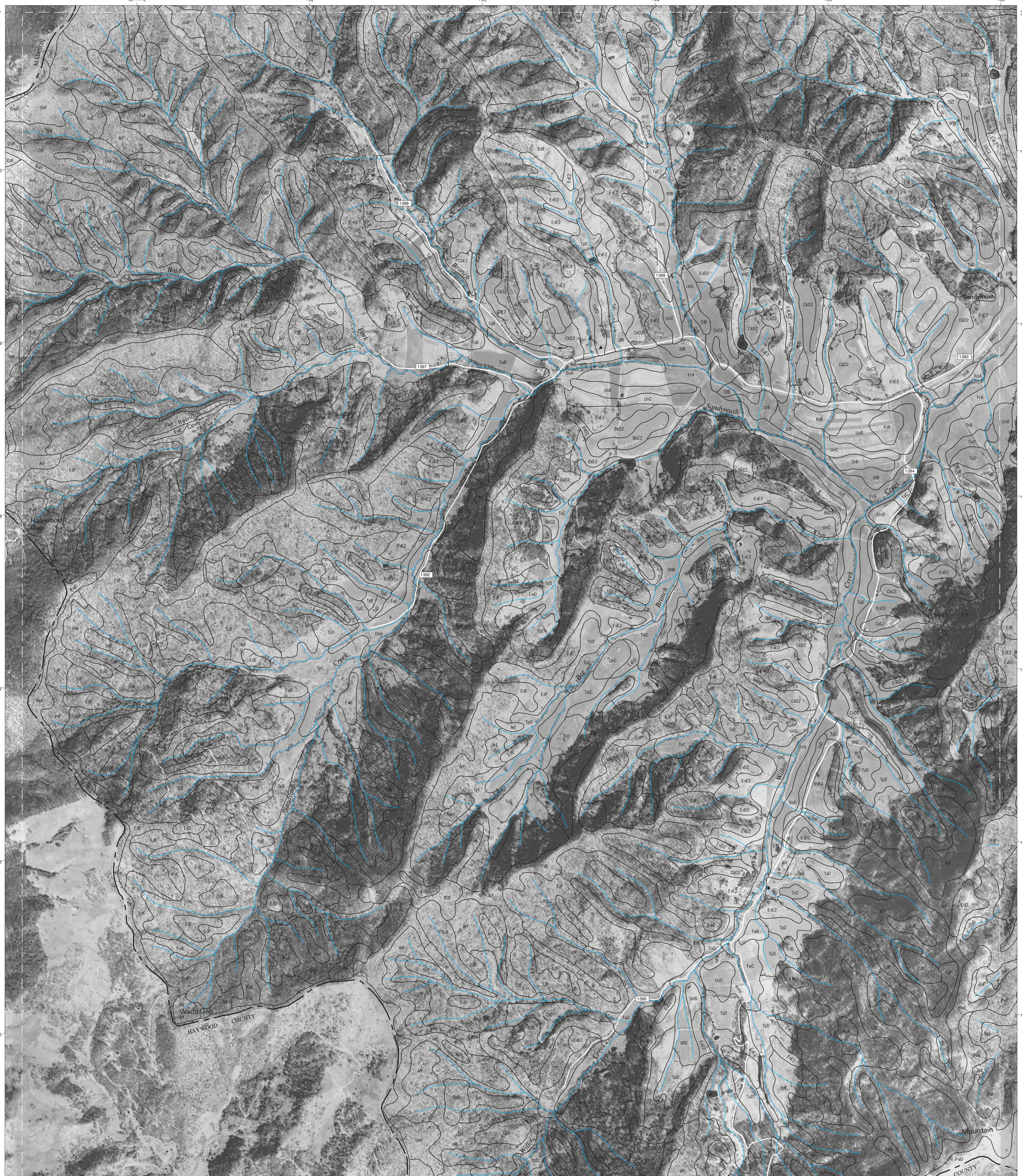
INDEX TO ADJOINING 3.75 MAPS

MOUNT MITCHELL NW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 2 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

Joins sheet 9, Sandymush NW
Joins sheet 10, Sandymush NE
Joins sheet 19, Fines Creek SE
Joins sheet 21, Sandymush SE



Joins sheet 30, Canton NW
Joins sheet 31, Canton NE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

	9	10
19		21
	30	31

9 SANDYMUSH NW
10 SANDYMUSH NE
19 FINES CREEK SE
21 SANDYMUSH SE
30 CANTON NW
31 CANTON NE

INDEX TO ADJOINING 3.75 MAPS

SANDYMUSH SW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 20 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

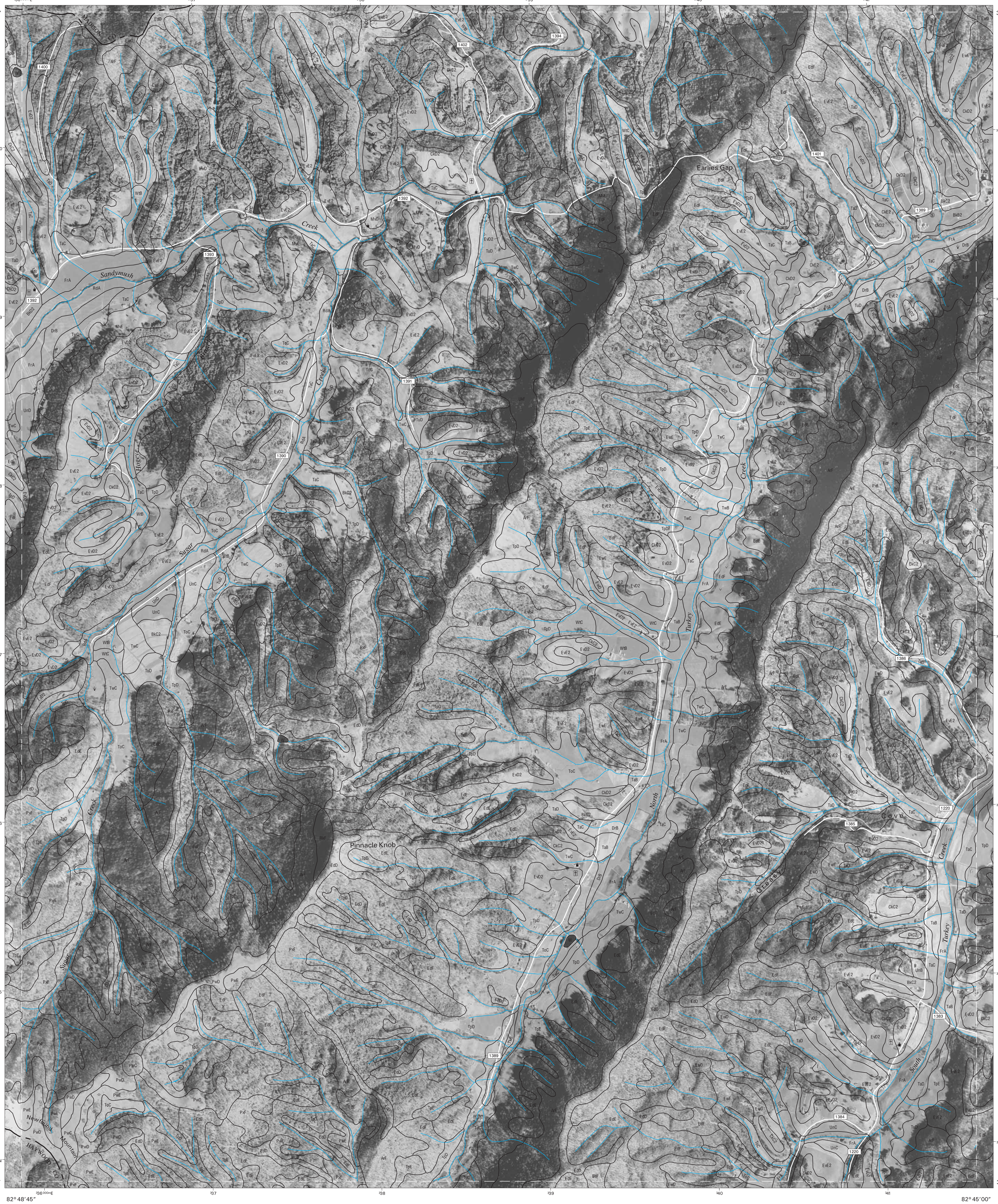
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
SANDYMUSH SE QUADRANGLE
SHEET NUMBER 21 OF 64

Joins sheet 9, Sandymush NW

Joins sheet 10, Sandymush NE

Joins sheet 11, Leicester NW



Joins sheet 20, Sandymush SW

Joins sheet 22, Leicester SW

Joins sheet 30, Canton NW

Joins sheet 31, Canton NE

Joins sheet 32, Enka NW

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

9	10	11
20		22
30	31	32

9 SANDYMUSH NW
10 SANDYMUSH NE
11 LEICESTER NW
20 SANDYMUSH SW
22 LEICESTER SW
30 CANTON NW
31 CANTON NE
32 ENKA NW

INDEX TO ADJOINING 3.75 MAPS

SANDYMUSH SE, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 21 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
LEICESTER SW QUADRANGLE
SHEET NUMBER 22 OF 64

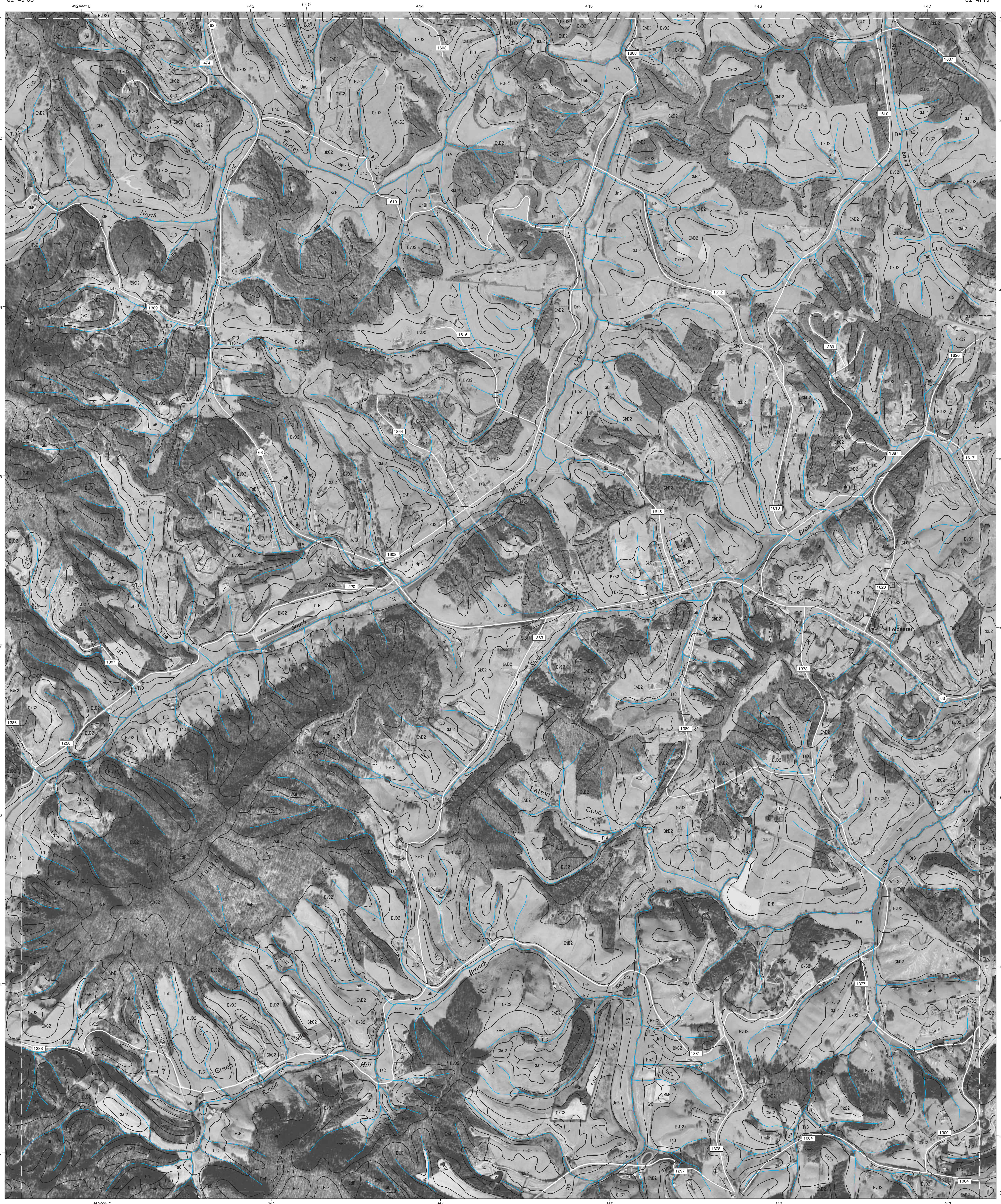
Joins sheet 10, Sandymush NE

Joins sheet 11, Leicester NW

Joins sheet 12, Leicester NE

Joins sheet 21, Sandymush SE

Joins sheet 23, Leicester SE



Joins sheet 31, Canton NE

Joins sheet 32, Enka NW

Joins sheet 33, Enka NE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES 0.5 0 0.5

FEET 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS 0.5 0 0.5

10	11	12
21		23
31	32	33

10 SANDYMUSH NE
11 LEICESTER NW
12 LEICESTER NE
21 SANDYMUSH SE
23 LEICESTER SE
31 CANTON NE
32 ENKA NW
33 ENKA NE

INDEX TO ADJOINING 3.75 MAPS

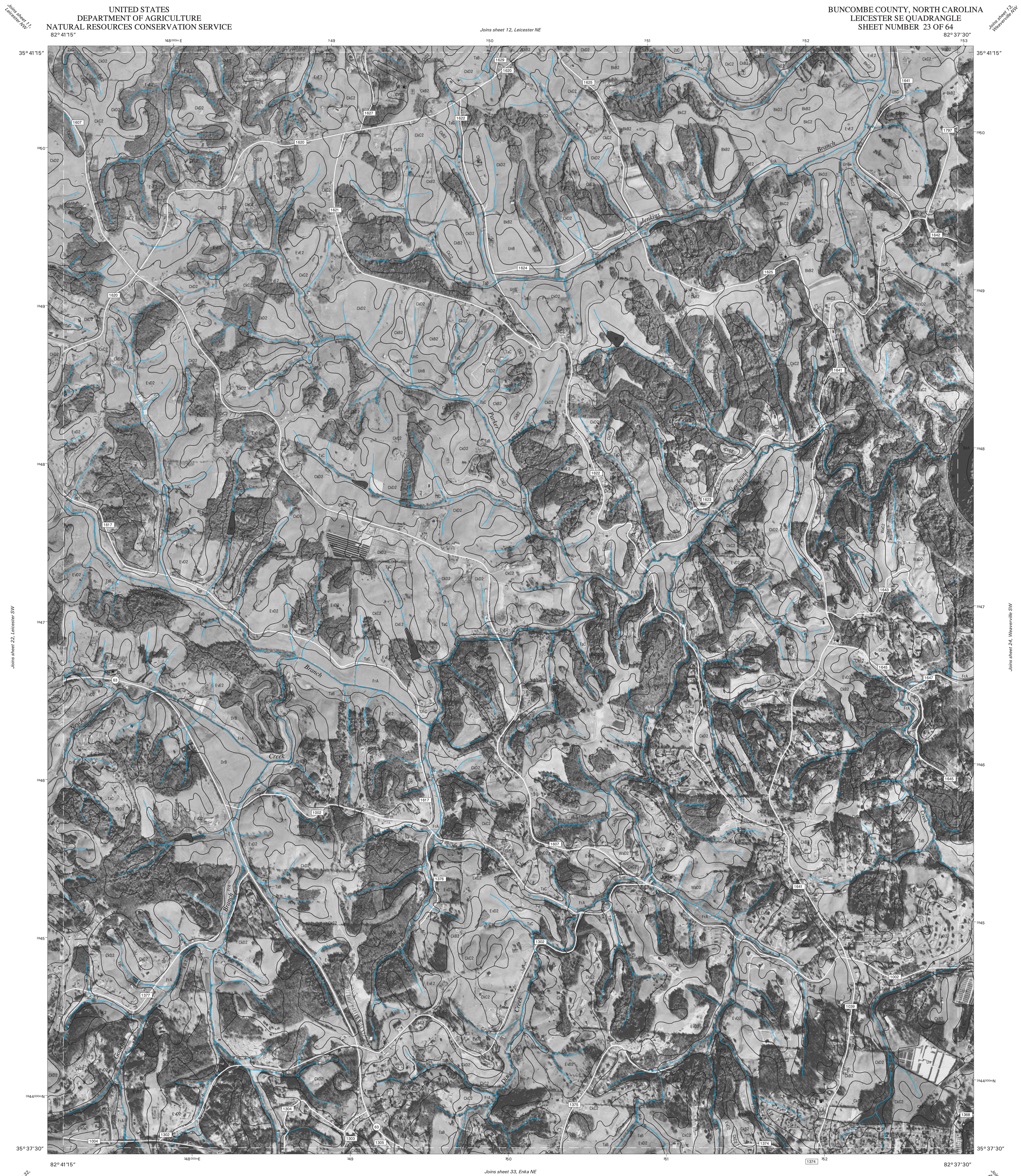
LEICESTER SW, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 22 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
LEICESTER SE QUADRANGLE
SHEET NUMBER 23 OF 64



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

11	12	13
22		24
32	33	34

11 LEICESTER NW
12 LEICESTER NE
13 WEAVERVILLE NW
22 LEICESTER SW
24 WEAVERVILLE SW
32 ENKA NW
33 ENKA NE
34 ASHEVILLE NW

INDEX TO ADJOINING 3.75 MAPS

LEICESTER SE, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 23 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

Joins sheet 34, Asheville NW

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1998-1999 aerial photography. Hydrography and culture information were acquired from Natural Resources Conservation Service. Hydrography and cultural layers were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 17.
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

12	13	14
23		25
33	34	35

12 LEICESTER NE
13 WEAVERVILLE NW
14 WEAVERVILLE NE
23 LEICESTER SE
25 WEAVERVILLE SE
33 ENKA NE
34 ASHEVILLE NW
35 ASHEVILLE NE

INDEX TO ADJOINING 3.75 MAPS

WEAVERVILLE SW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 24 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
WEAVERVILLE SE QUADRANGLE
SHEET NUMBER 25 OF 64

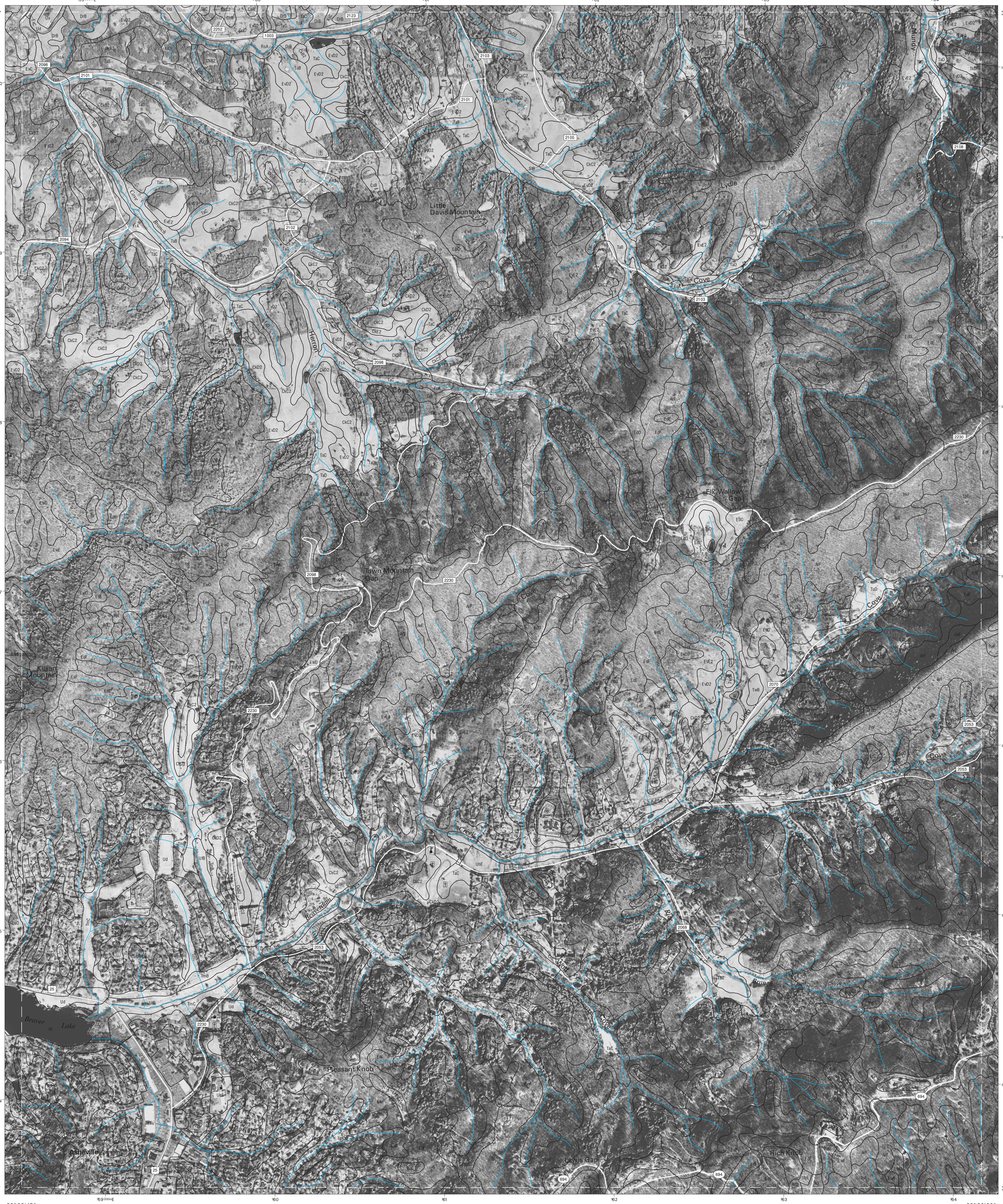
Joins sheet 13, Weaverville NW

Joins sheet 14, Weaverville NE

Joins sheet 15, Craggy Pinnacle NW

Joins sheet 24, Weaverville SW

Joins sheet 26, Craggy Pinnacle SW



Joins sheet 34, Asheville NW

Joins sheet 35, Asheville NE

Joins sheet 36, Oteen NW

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1998-1999 aerial photography. Hydrography and culture information were acquired from Natural Resources Conservation Service. Hydrography and cultural layers were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

13	14	15
24		26
34	35	36

13 WEAVERVILLE NW
14 WEAVERVILLE NE
15 CRAGGY PINNACLE NW
24 WEAVERVILLE SW
26 CRAGGY PINNACLE SW
34 ASHEVILLE NW
35 ASHEVILLE NE
36 OTEEN NW

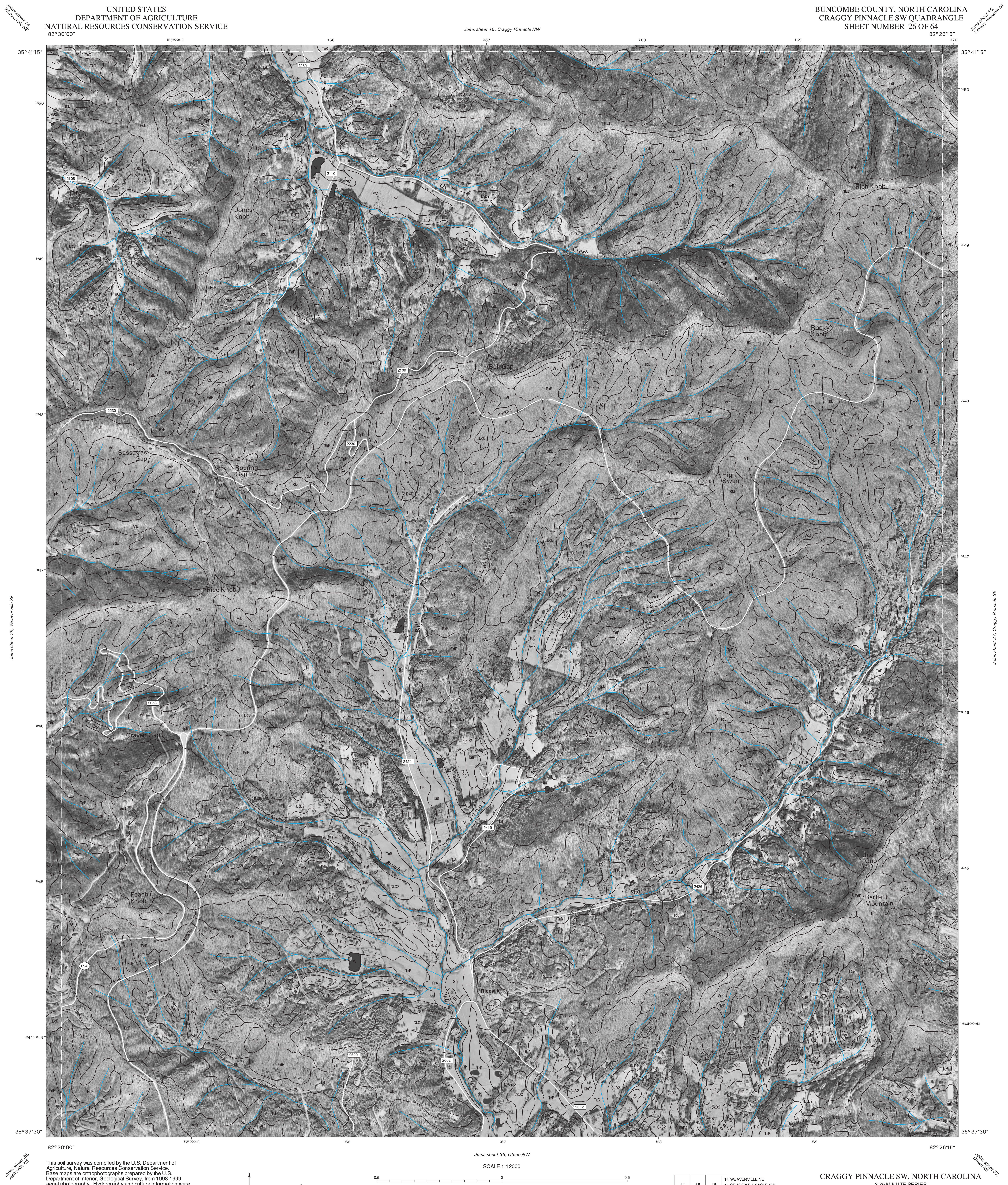
INDEX TO ADJOINING 3.75 MAPS

WEAVERVILLE SE, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 25 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
CRAGGY PINNACLE SW QUADRANGLE
SHEET NUMBER 26 OF 64



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

14	15	16
25		27
35	36	37

14 WEAVERVILLE NE
15 CRAGGY PINNACLE NW
16 CRAGGY PINNACLE NE
25 WEAVERVILLE SE
27 CRAGGY PINNACLE SE
35 ASHEVILLE NE
36 OTEEN NW
37 OTEEN NE

INDEX TO ADJOINING 3.75 MAPS

CRAGGY PINNACLE SW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 26 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

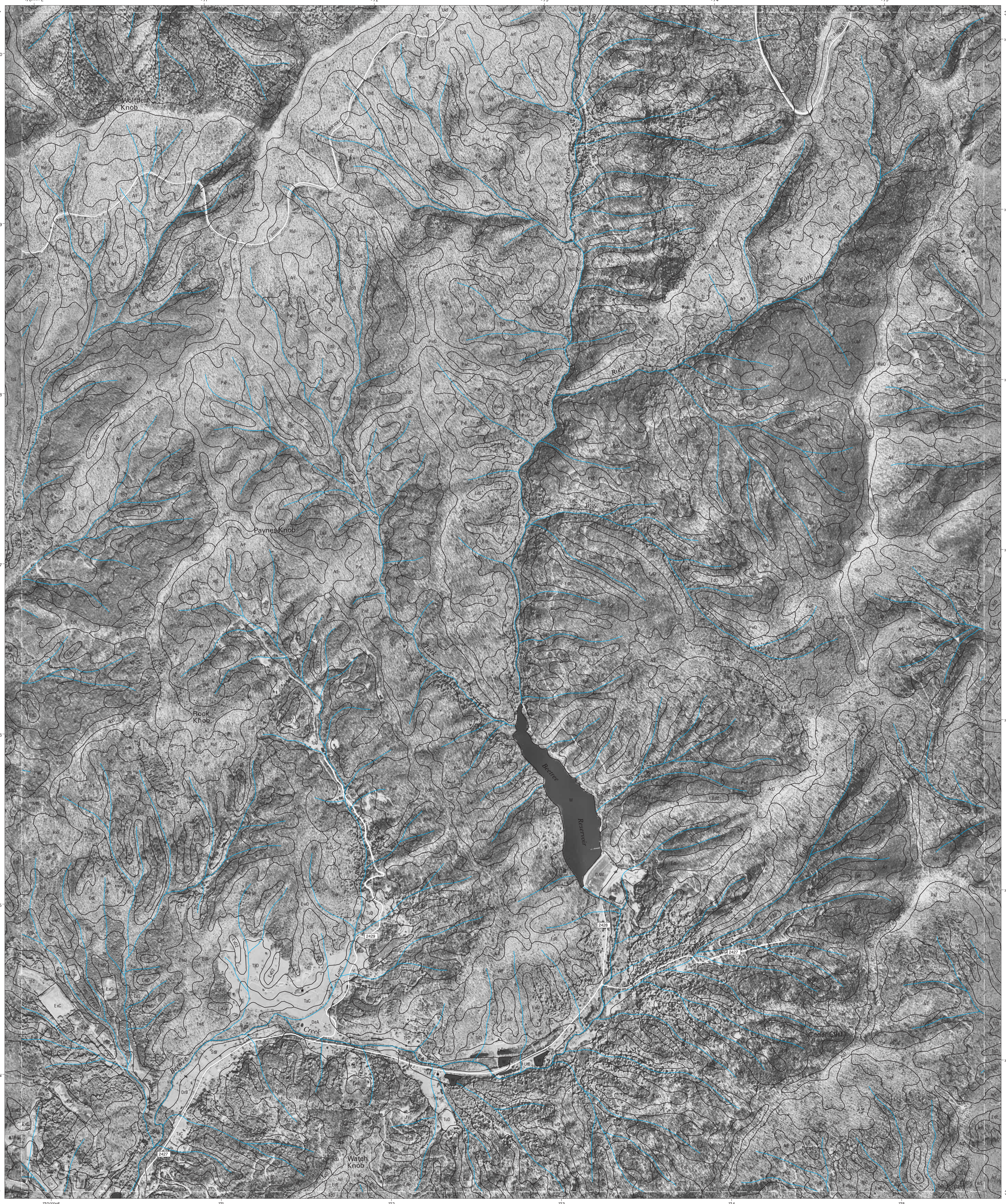
Joins sheet 15, Craggy Pinnacle NW

Joins sheet 16, Craggy Pinnacle NE

Joins sheet 17, Montreat NW

82° 26′15″ 82° 22′30″

35° 41′15″ 35° 41′15″



Joins sheet 26, Craggy Pinnacle SW

Joins sheet 28, Montreat SW

35° 37′30″ 35° 37′30″

82° 26′15″ 82° 22′30″

Joins sheet 36, Oteen NW

Joins sheet 37, Oteen NE

Joins sheet 38, Black Mountain NW

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NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

15	16	17
26		28
36	37	38

15 CRAGGY PINNACLE NW
16 CRAGGY PINNACLE NE
17 MONTREAT NW
26 CRAGGY PINNACLE SW
28 MONTREAT SW
36 OTEEN NW
37 OTEEN NE
38 BLACK MOUNTAIN NW

INDEX TO ADJOINING 3.75 MAPS

CRAGGY PINNACLE SE, NORTH CAROLINA

3.75 MINUTE SERIES

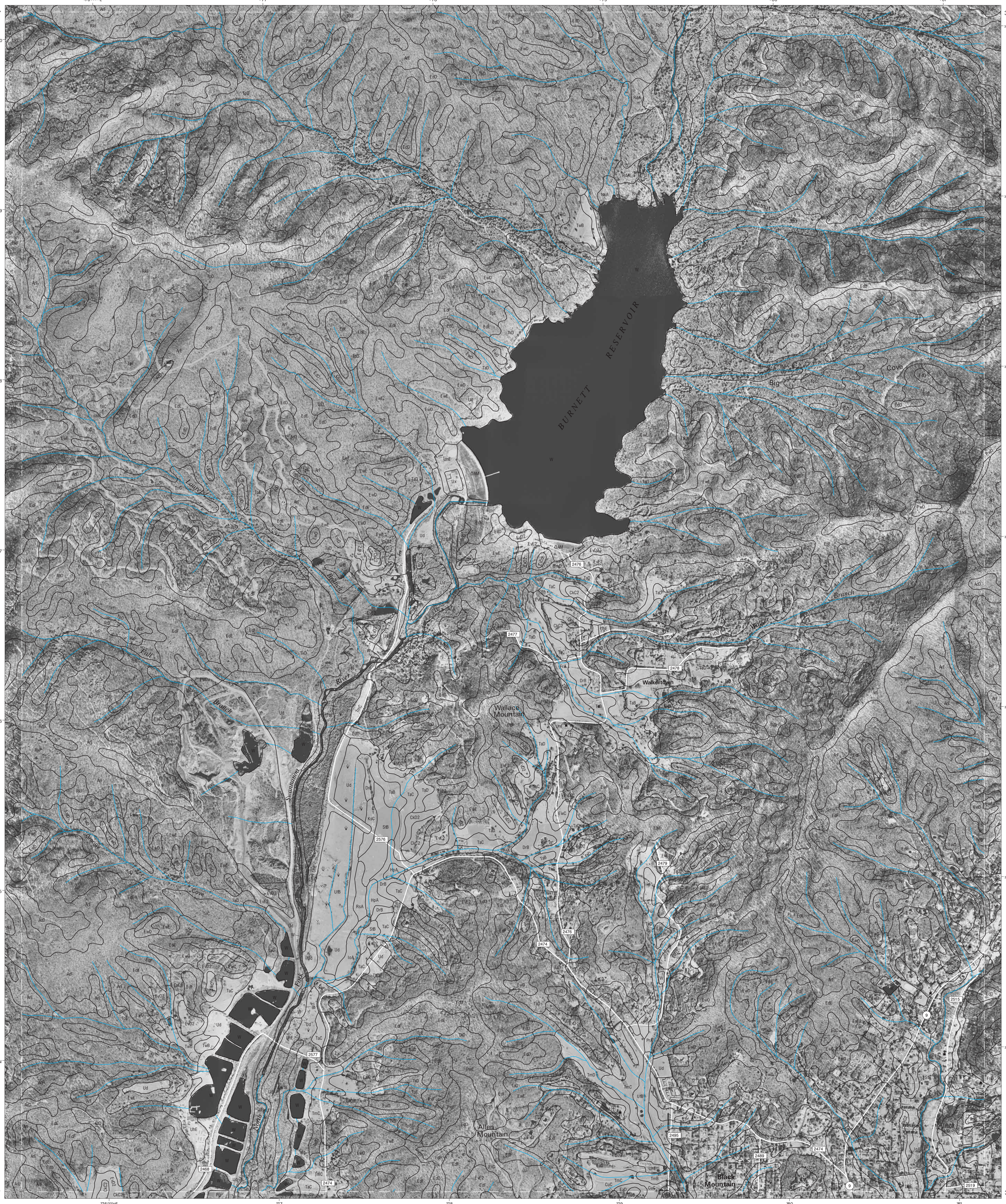
SHEET NUMBER 27 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

Joins sheet 16, Craggy Pinnacle NE

Joins sheet 17, Montreat NW

Joins sheet 18, Montreat NE



Joins sheet 27, Craggy Pinnacle SE

Joins sheet 29, Montreat SE

Joins sheet 37, Oteen NE

Joins sheet 38, Black Mountain NW

Joins sheet 39, Black Mountain NE

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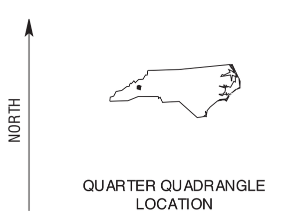


QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

16	17	18
27		29
37	38	39

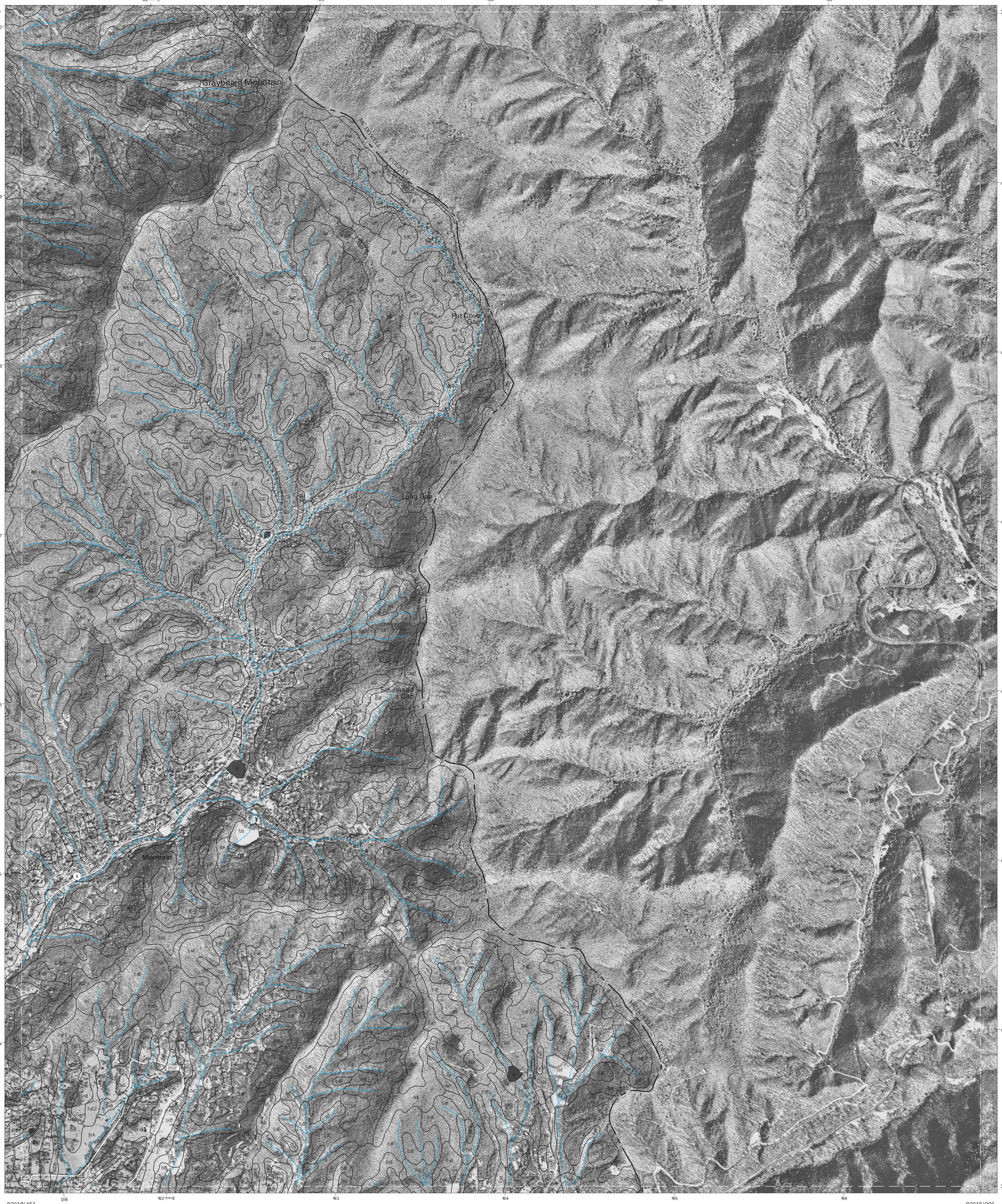
16 CRAGGY PINNACLE NE
17 MONTREAT NW
18 MONTREAT NE
27 CRAGGY PINNACLE SE
29 MONTREAT SE
37 OTEEN NE
38 BLACK MOUNTAIN NW
39 BLACK MOUNTAIN NE

INDEX TO ADJOINING 3.75 MAPS

MONTREAT SW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 28 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

17	18	
28		
38	39	

17 MONTREAT NW
18 MONTREAT NE
28 MONTREAT SW
38 BLACK MOUNTAIN NW
39 BLACK MOUNTAIN NE

INDEX TO ADJOINING 3.75 MAPS

MONTREAT SE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 29 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
MARSHALL SE QUADRANGLE
SHEET NUMBER 3 OF 64

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

		4
11	12	13

4 MARS HILL SW
11 LEICESTER NW
12 LEICESTER NE
13 WEAVERVILLE NW

INDEX TO ADJOINING 3.75 MAPS

MARSHALL SE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 3 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
CANTON NW QUADRANGLE
SHEET NUMBER 30 OF 64

Joins sheet 19, Fines Creek SE

Joins sheet 20, Sandymush SW

Joins sheet 21, Sandymush SE

82° 52′30″ — 82° 48′45″

35° 37′30″

35° 33′45″

82° 52′30″ — 82° 48′45″

Joins sheet 31, Canton NE

Joins sheet 40, Canton SE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 — 0 — 0.5 MILES

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 — 0 — 0.5 KILOMETERS

19	20	21
		31
		40

19 FINES CREEK SE
20 SANDYMUSH SW
21 SANDYMUSH SE
31 CANTON NE
40 CANTON SE

INDEX TO ADJOINING 3.75 MAPS

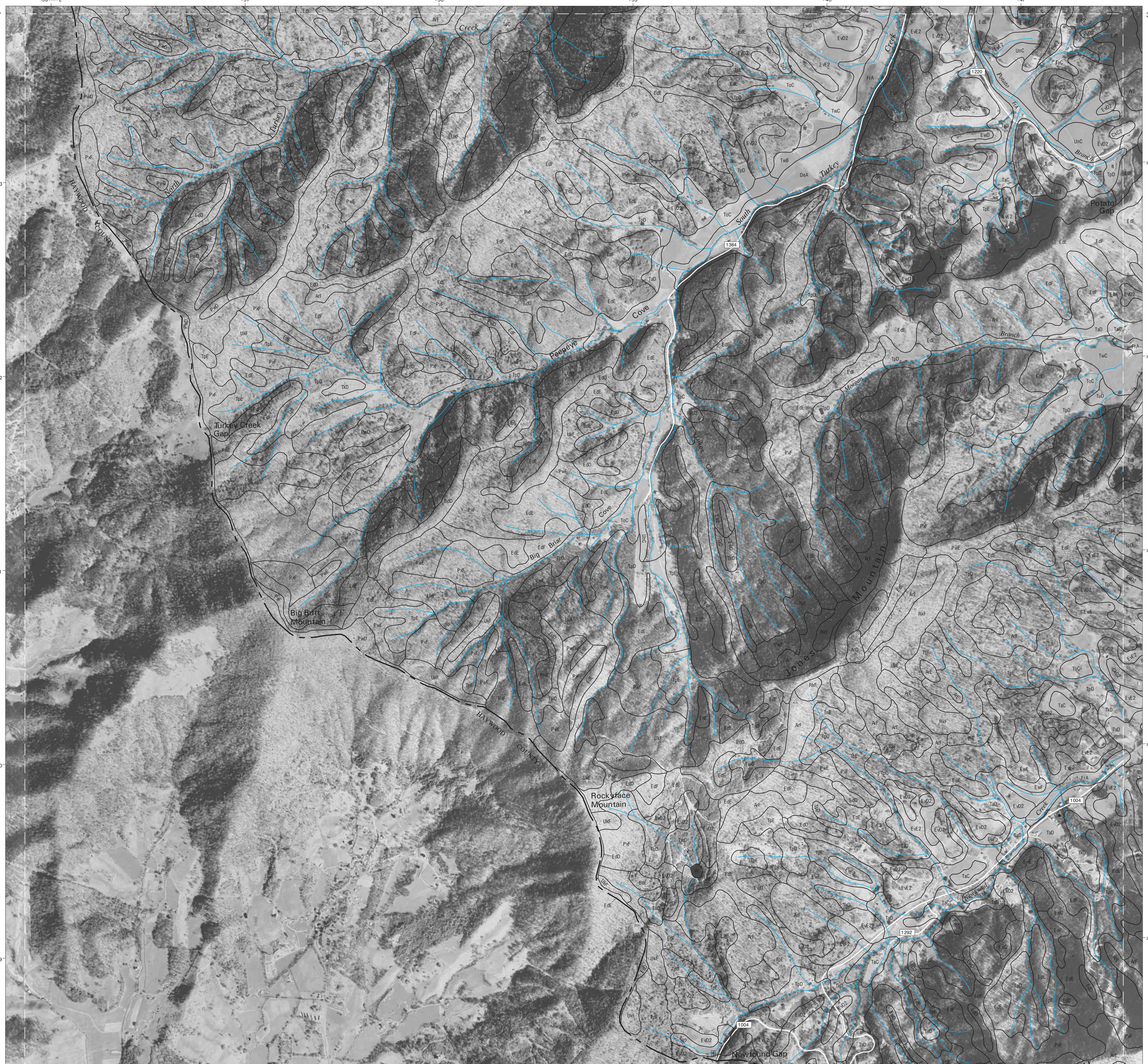
CANTON NW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 30 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

Joins sheet 20, Sandymush SW

Joins sheet 21, Sandymush SE

Joins sheet 22, Leicester SW



Joins sheet 30, Canton NW

Joins sheet 32, Enka NW

Joins sheet 40, Canton SE

Joins sheet 41, Enka SW

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

20	21	22
30		32
	40	41

20 SANDYMUSH SW
21 SANDYMUSH SE
22 LEICESTER SW
30 CANTON NW
32 ENKA NW
40 CANTON SE
41 ENKA SW

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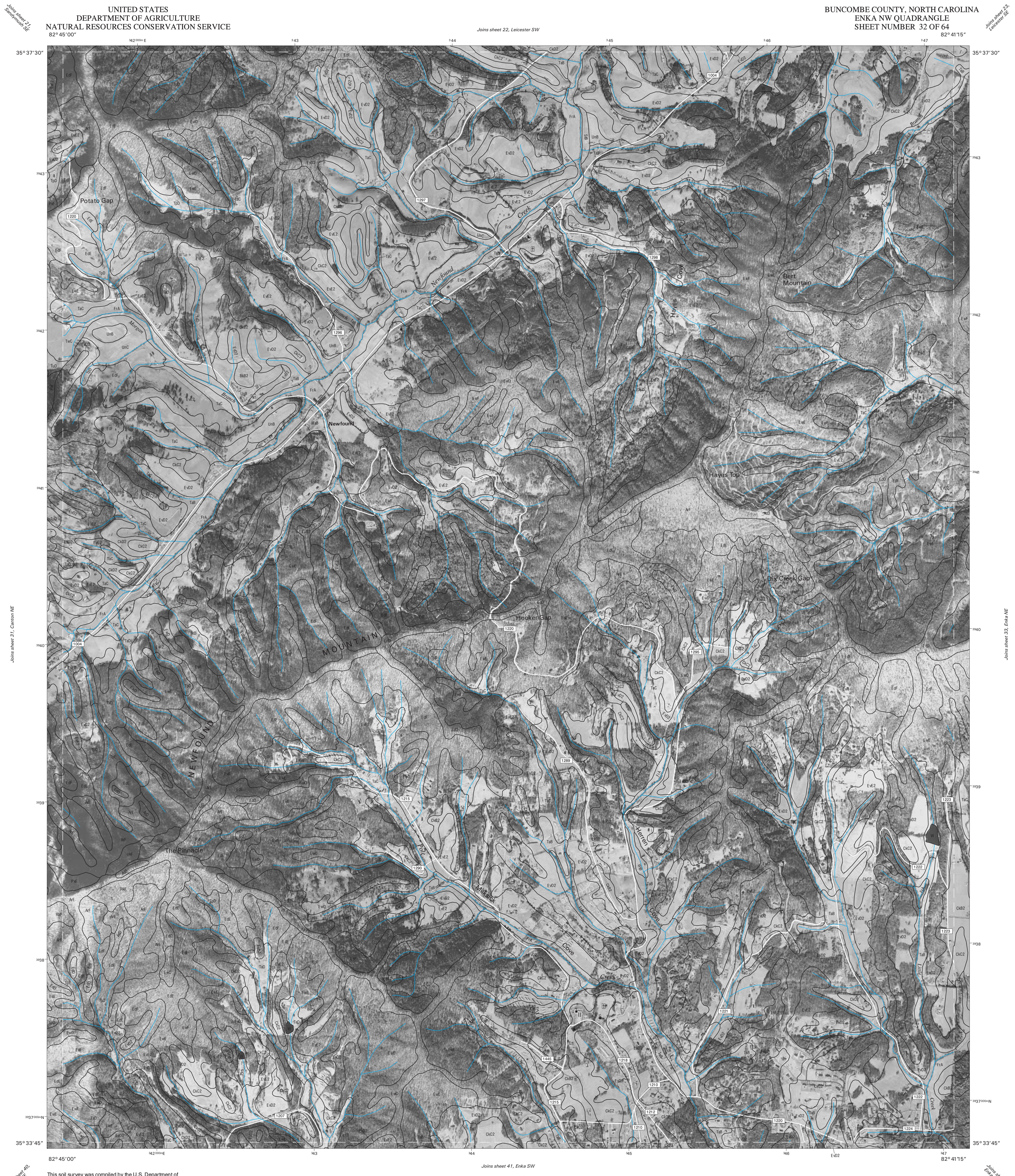
CANTON NE, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 31 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
ENKA NW QUADRANGLE
SHEET NUMBER 32 OF 64



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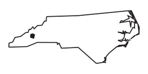
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5 MILES

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 0 0.5 KILOMETERS

21	22	23
31		33
40	41	42

21 SANDYMUSH SE
22 LEICESTER SW
23 LEICESTER SE
31 CANTON NE
33 ENKA NE
40 CANTON SE
41 ENKA SW
42 ENKA SE

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Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
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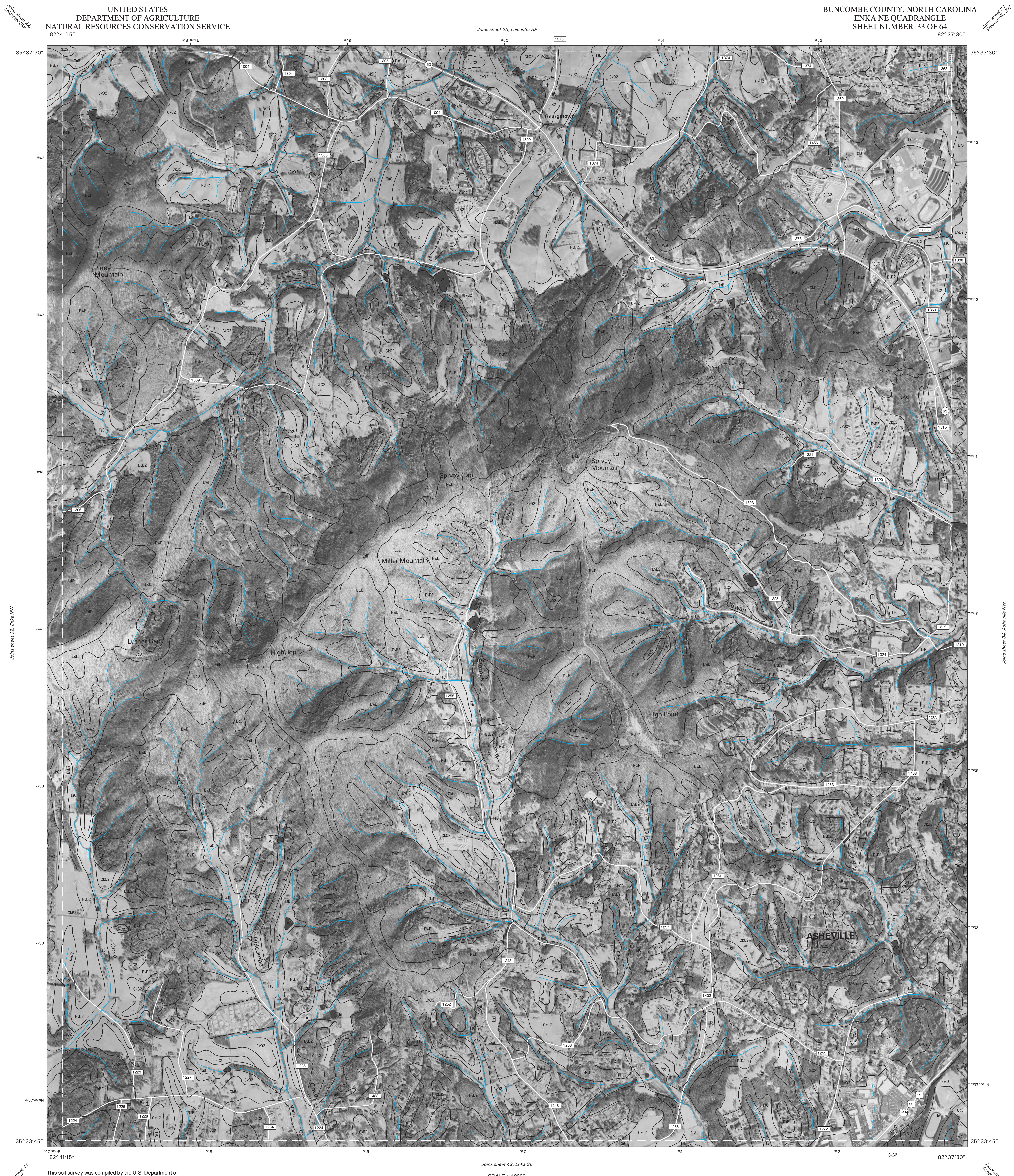
BUNCOMBE COUNTY, NORTH CAROLINA
ENKA NE QUADRANGLE
SHEET NUMBER 33 OF 64



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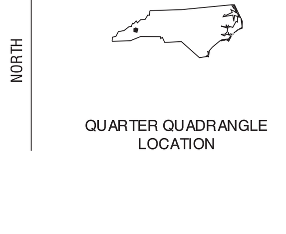
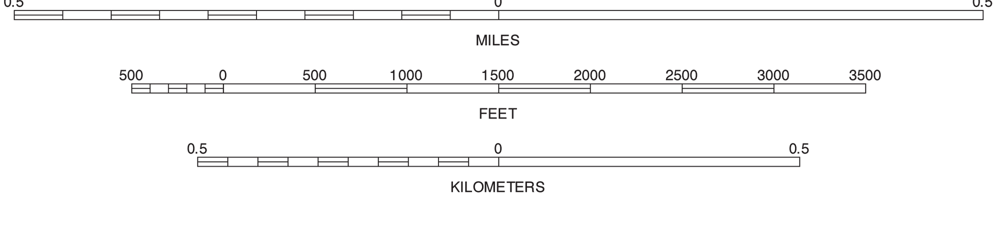
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.





22	23	24
32		34
41	42	43

22 LEICESTER SW
23 LEICESTER SE
24 WEAVERVILLE SW
32 ENKA NW
34 ASHEVILLE NW
41 ENKA SW
42 ENKA SE
43 ASHEVILLE SW

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Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

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DEPARTMENT OF AGRICULTURE
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BUNCOMBE COUNTY, NORTH CAROLINA
ASHEVILLE NW QUADRANGLE
SHEET NUMBER 34 OF 64

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1998-1999 aerial photography. Hydrography and culture information were acquired from Natural Resources Conservation Service. Hydrography and cultural layers were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

23	24	25
33		35
42	43	44

23 LEICESTER SE
24 WEAVERVILLE SW
25 WEAVERVILLE SE
33 ENKA NE
35 ASHEVILLE NE
42 ENKA SE
43 ASHEVILLE SW
44 ASHEVILLE SE

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ASHEVILLE NW, NORTH CAROLINA

3.75 MINUTE SERIES
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Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
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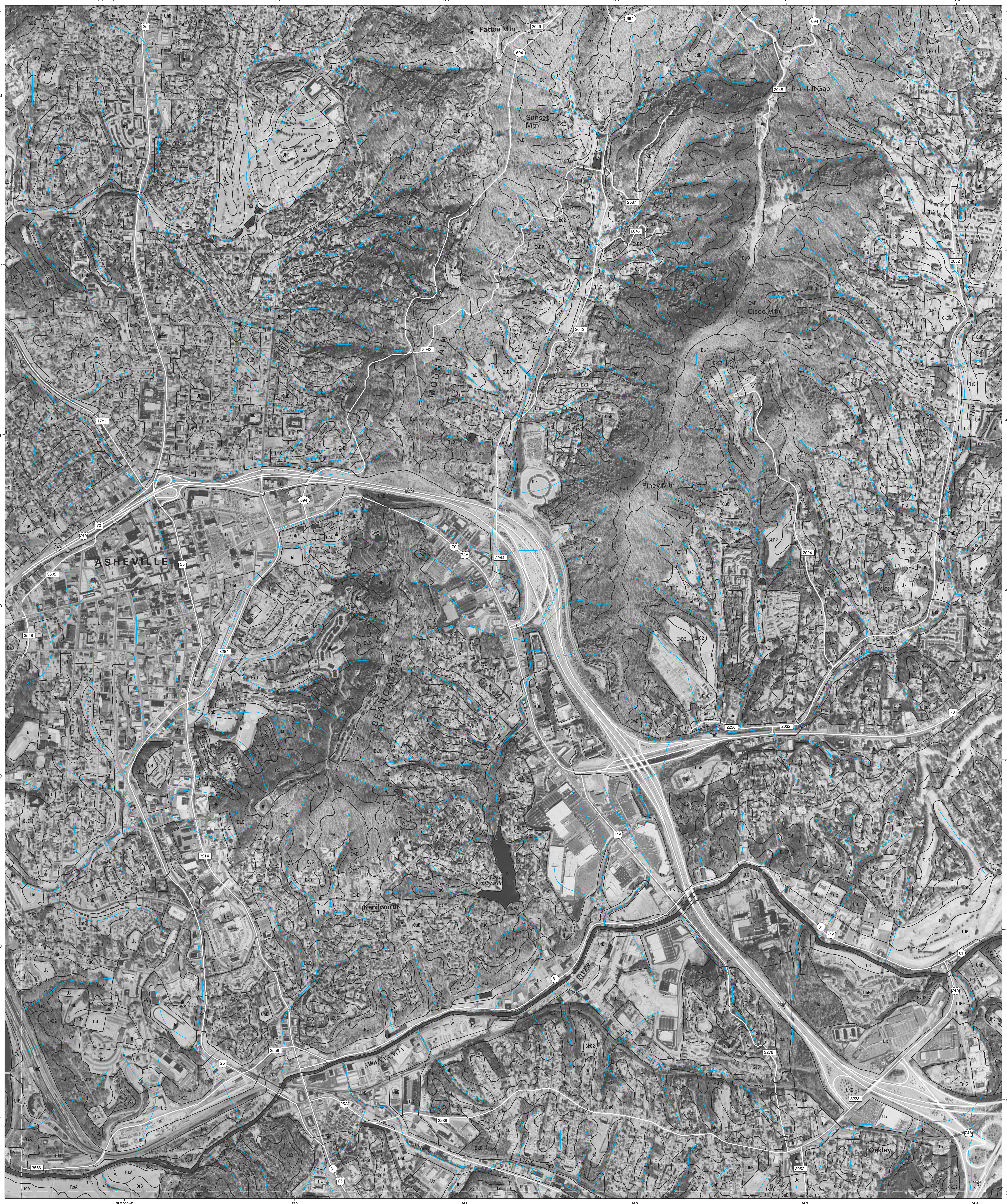
BUNCOMBE COUNTY, NORTH CAROLINA
ASHEVILLE NE QUADRANGLE
SHEET NUMBER 35 OF 64

Joins sheet 24, Weaverville SW

Joins sheet 25, Weaverville SE

Joins sheet 26, Craggy Pinnacle SW

82° 33′ 45″ — 35° 37′ 30″ — 82° 30′ 00″



Joins sheet 34, Asheville NW

Joins sheet 36, Oteen NW

35° 33′ 45″ — 82° 33′ 45″ — 82° 30′ 00″

Joins sheet 43, Asheville SW

Joins sheet 44, Asheville SE

Joins sheet 45, Oteen SW

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5 MILES

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 0 0.5 KILOMETERS

24	25	26
34		36
43	44	45

24 WEAVERVILLE SW
25 WEAVERVILLE SE
26 CRAGGY PINNACLE SW
34 ASHEVILLE NW
36 OTEEN NW
43 ASHEVILLE SW
44 ASHEVILLE SE
45 OTEEN SW

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ASHEVILLE NE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 35 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

25	26	27
35		37
44	45	46

25 WEAVERVILLE SE
26 CRAGGY PINNACLE SW
27 CRAGGY PINNACLE SE
35 ASHEVILLE NE
37 OTEEN NE
44 ASHEVILLE SE
45 OTEEN SW
46 OTEEN SE

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OTEEN NW, NORTH CAROLINA

3.75 MINUTE SERIES

SHEET NUMBER 36 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

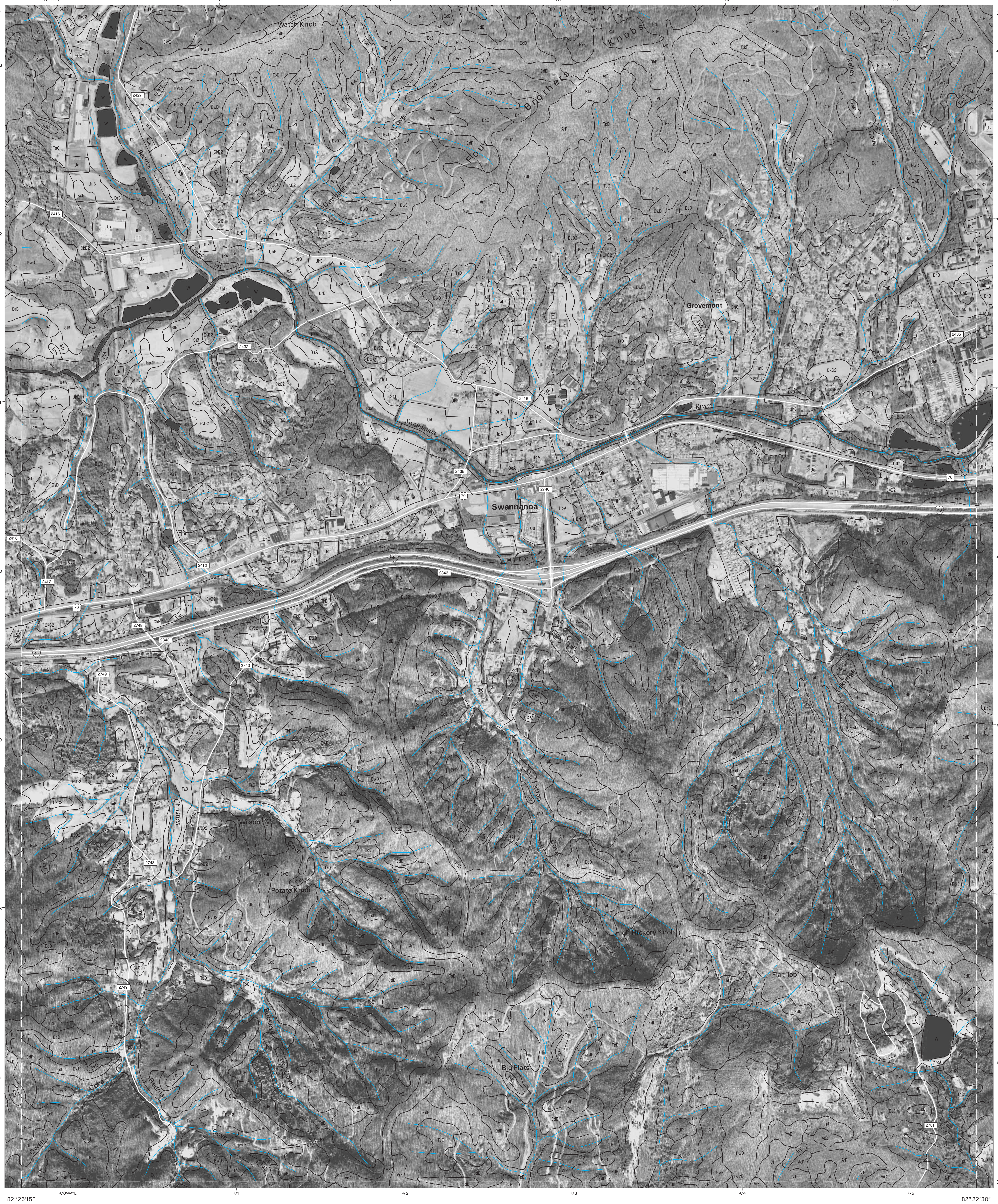
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
OTEEN NE QUADRANGLE
SHEET NUMBER 37 OF 64

Joins sheet 26, Craggy Pinnacle SW

Joins sheet 27, Craggy Pinnacle SE

Joins sheet 28, Montreat SW



Joins sheet 45, Oteen SW

Joins sheet 46, Oteen SE

Joins sheet 47, Black Mountain SW

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

26	27	28
36		38
45	46	47

26 CRAGGY PINNACLE SW
27 CRAGGY PINNACLE SE
28 MONTREAT SW
36 OTEEN NW
38 BLACK MOUNTAIN NW
45 OTEEN SW
46 OTEEN SE
47 BLACK MOUNTAIN SW

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Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

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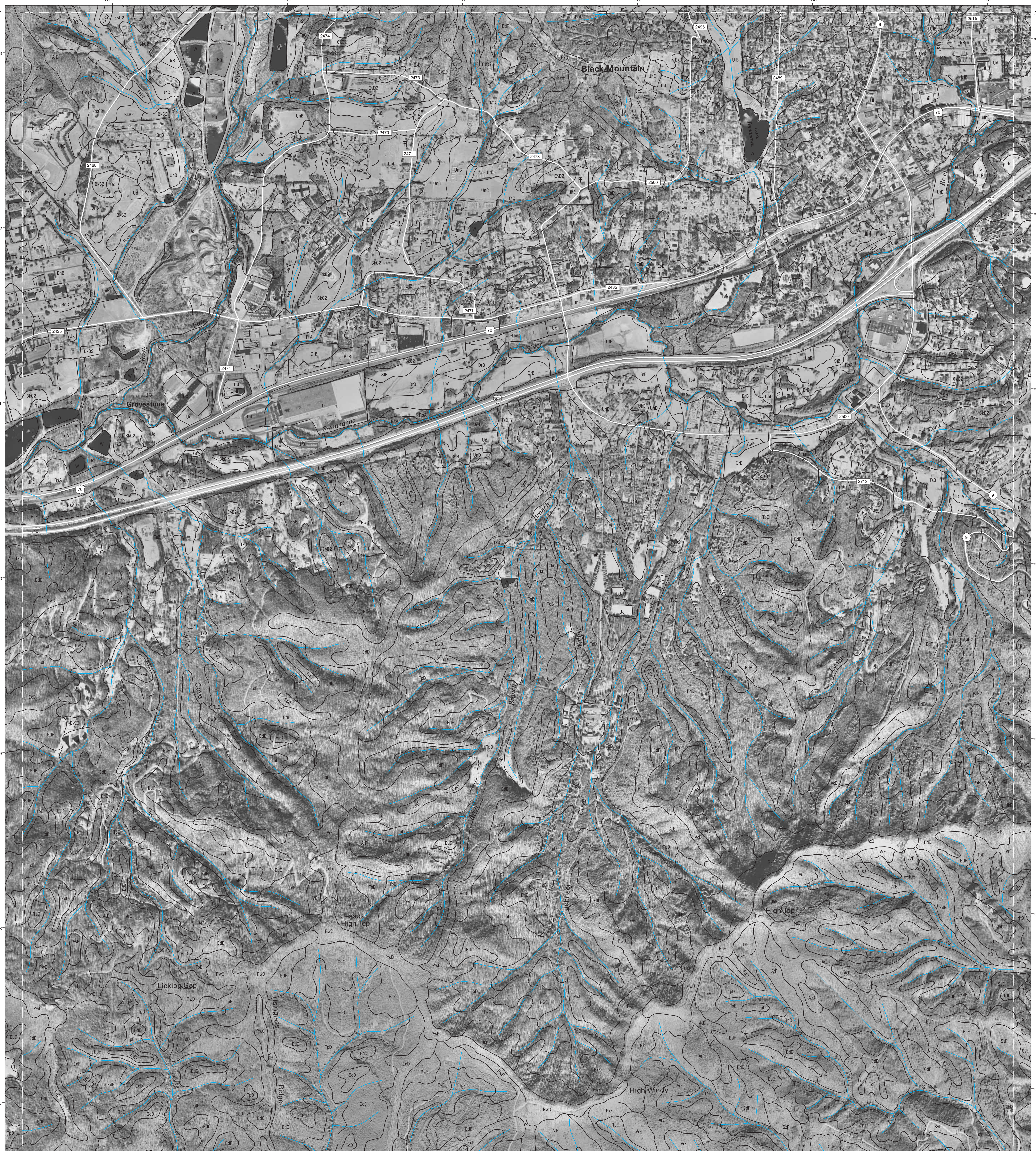
BUNCOMBE COUNTY, NORTH CAROLINA
BLACK MOUNTAIN NW QUADRANGLE
SHEET NUMBER 38 OF 64

Joins sheet 27, Craggy Pinnacle SE

Joins sheet 28, Montreat SW

Joins sheet 29, Montreat SE

82° 22′30″ 35° 37′30″ 82°18′45″



Joins sheet 37, Oteen NE

Joins sheet 39, Black Mountain NE

35° 33′45″ 82° 22′30″ 82°18′45″

Joins sheet 46, Oteen SE

Joins sheet 47, Black Mountain SW

Joins sheet 48, Black Mountain SE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

27	28	29
37		39
46	47	48

27 CRAGGY PINNACLE SE
28 MONTREAT SW
29 MONTREAT SE
37 OTEEN NE
39 BLACK MOUNTAIN NE
46 OTEEN SE
47 BLACK MOUNTAIN SW
48 BLACK MOUNTAIN SE

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BLACK MOUNTAIN NW, NORTH CAROLINA

3.75 MINUTE SERIES
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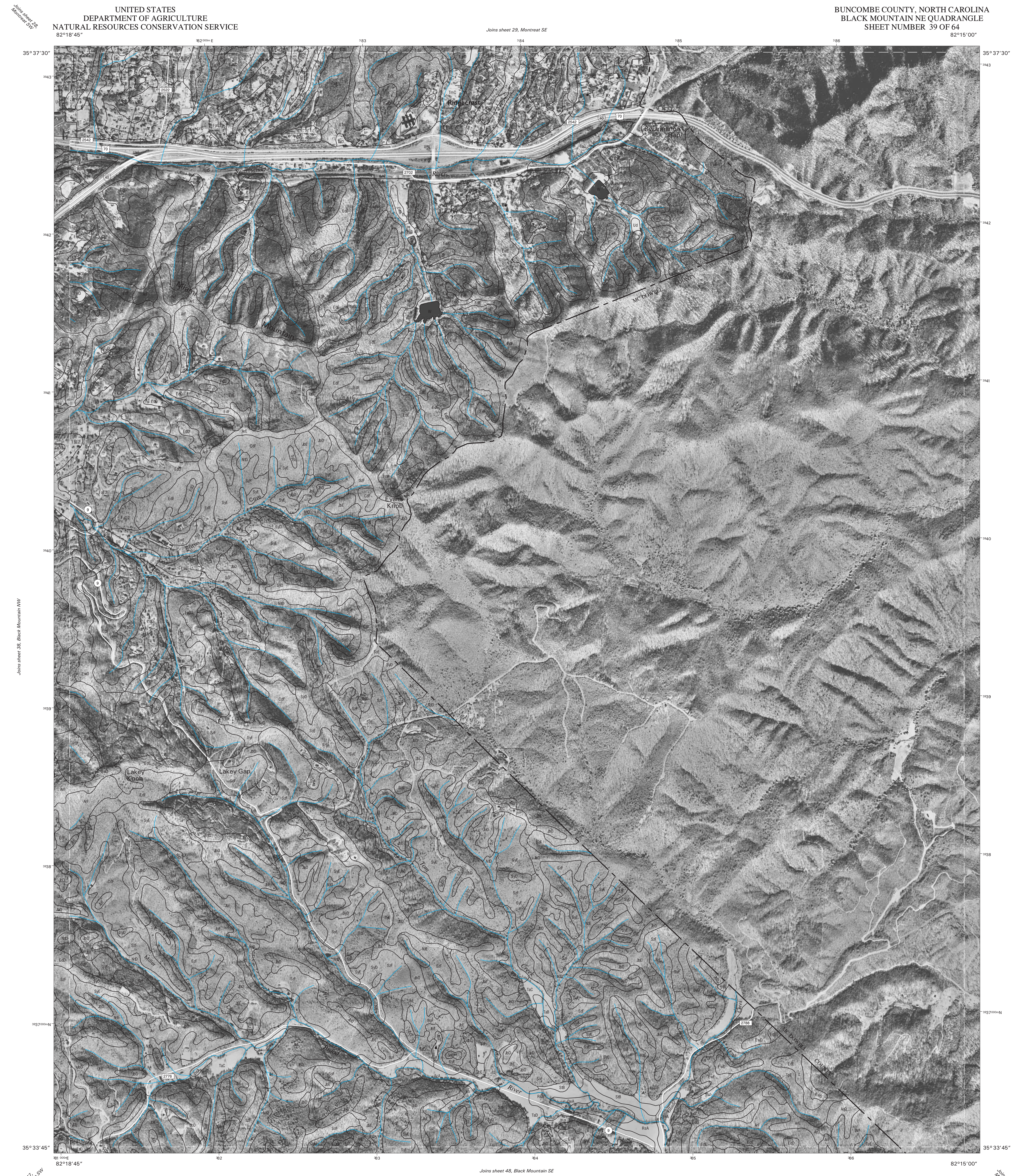
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
BLACK MOUNTAIN NE QUADRANGLE
SHEET NUMBER 39 OF 64



SCALE 1:12000

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QUARTER QUADRANGLE LOCATION

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28 MONTREAT SW
29 MONTREAT SE
38 BLACK MOUNTAIN NW
47 BLACK MOUNTAIN SW
48 BLACK MOUNTAIN SE
49 MOFFITT HILL SW

BLACK MOUNTAIN NE, NORTH CAROLINA
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Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
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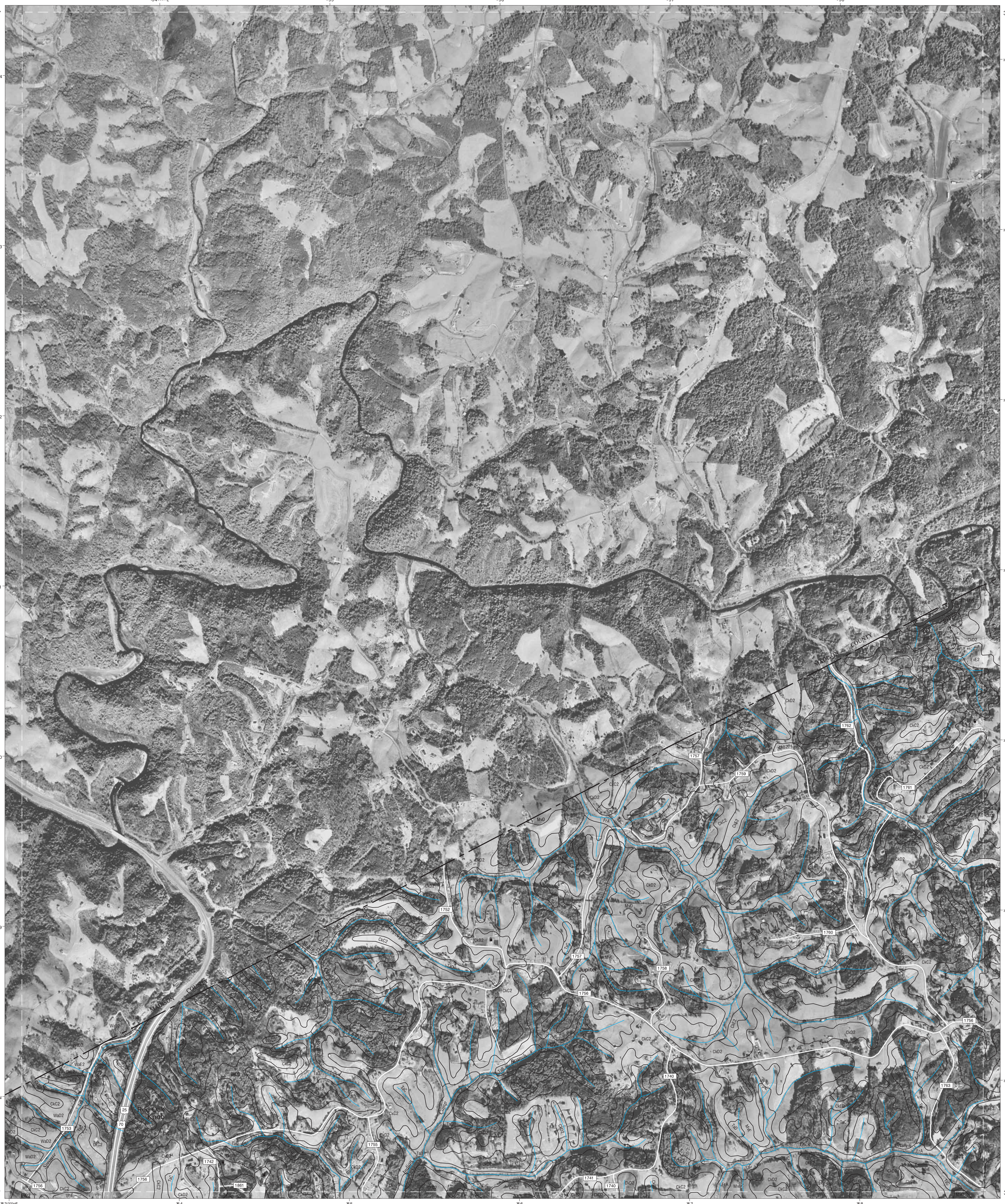
BUNCOMBE COUNTY, NORTH CAROLINA
MARS HILL SW QUADRANGLE
SHEET NUMBER 4 OF 64

82° 37′30″ 82° 33′45″
35° 48′45″ 35° 48′45″



35° 45′00″ 35° 45′00″
82° 37′30″ 82° 33′45″

Joins sheet 3, Marshall SE

Joins sheet 5, Mars Hill SE

Joins sheet 12, Leicester NE

Joins sheet 13, Weaverville NW

Joins sheet 14, Weaverville NE

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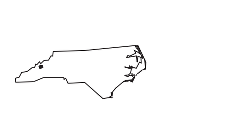
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

3		5
12	13	14

3 MARSHALL SE
5 MARS HILL SE
12 LEICESTER NE
13 WEAVERVILLE NW
14 WEAVERVILLE NE

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MARS HILL SW, NORTH CAROLINA
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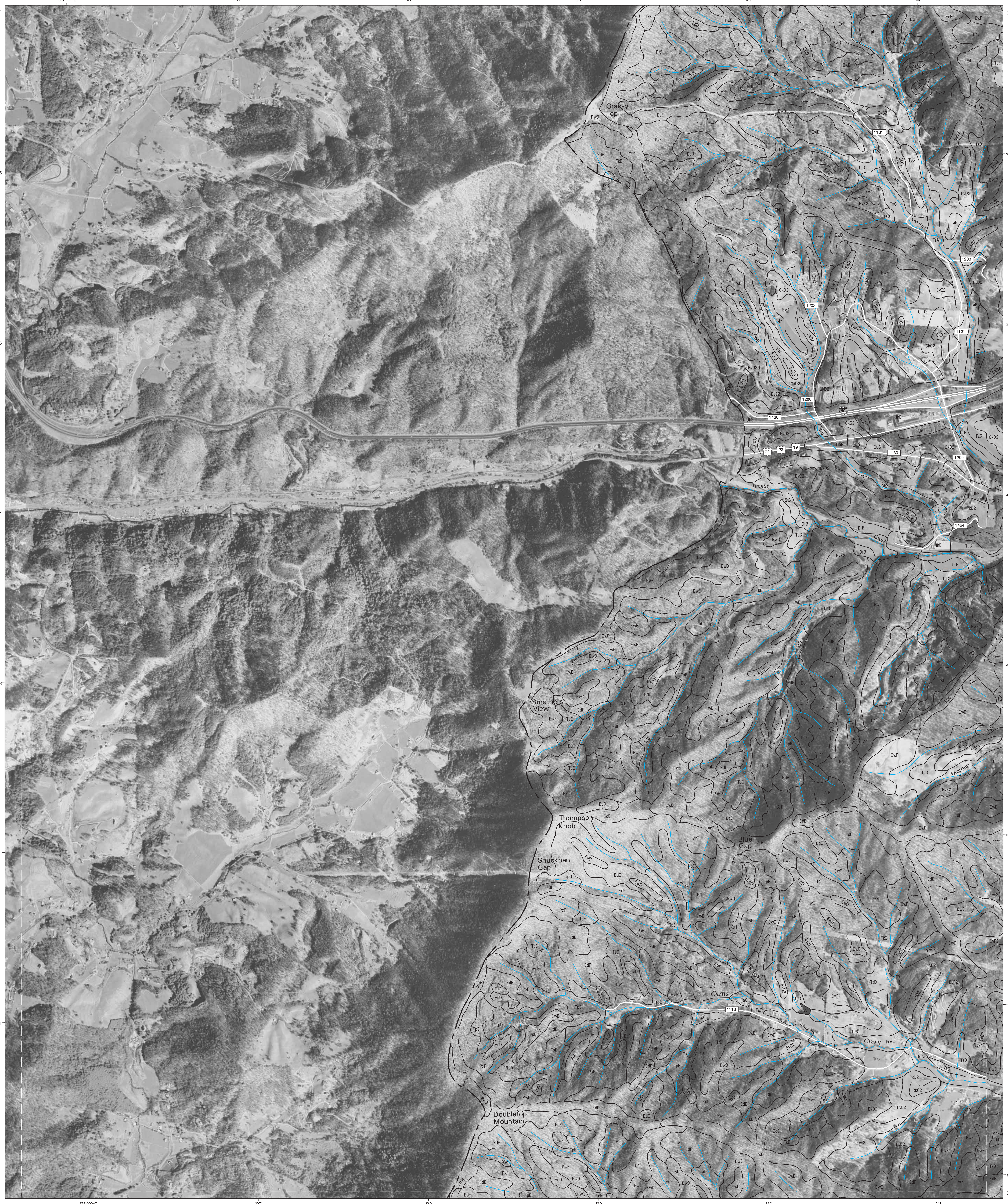
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

Joins sheet 30, Canton NW

Joins sheet 31, Canton NE

Joins sheet 32, Enka NW



Joins sheet 41, Enka SW

Joins sheet 51, Cruso NE

Joins sheet 52, Dunsmore Mountain NW

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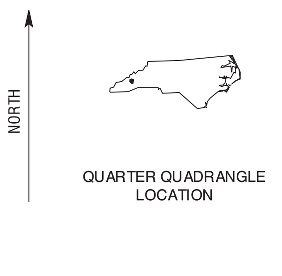
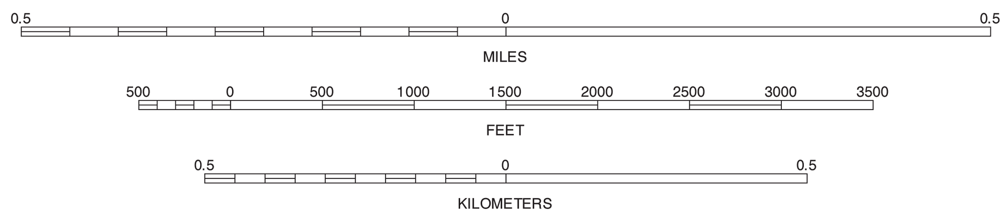
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



SCALE 1:12000



30	31	32
		41
	51	52

30 CANTON NW
31 CANTON NE
32 ENKA NW
41 ENKA SW
51 CRUSO NE
52 DUNSMORE MOUNTAIN NW

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CANTON SE, NORTH CAROLINA

3.75 MINUTE SERIES
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Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

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DEPARTMENT OF AGRICULTURE
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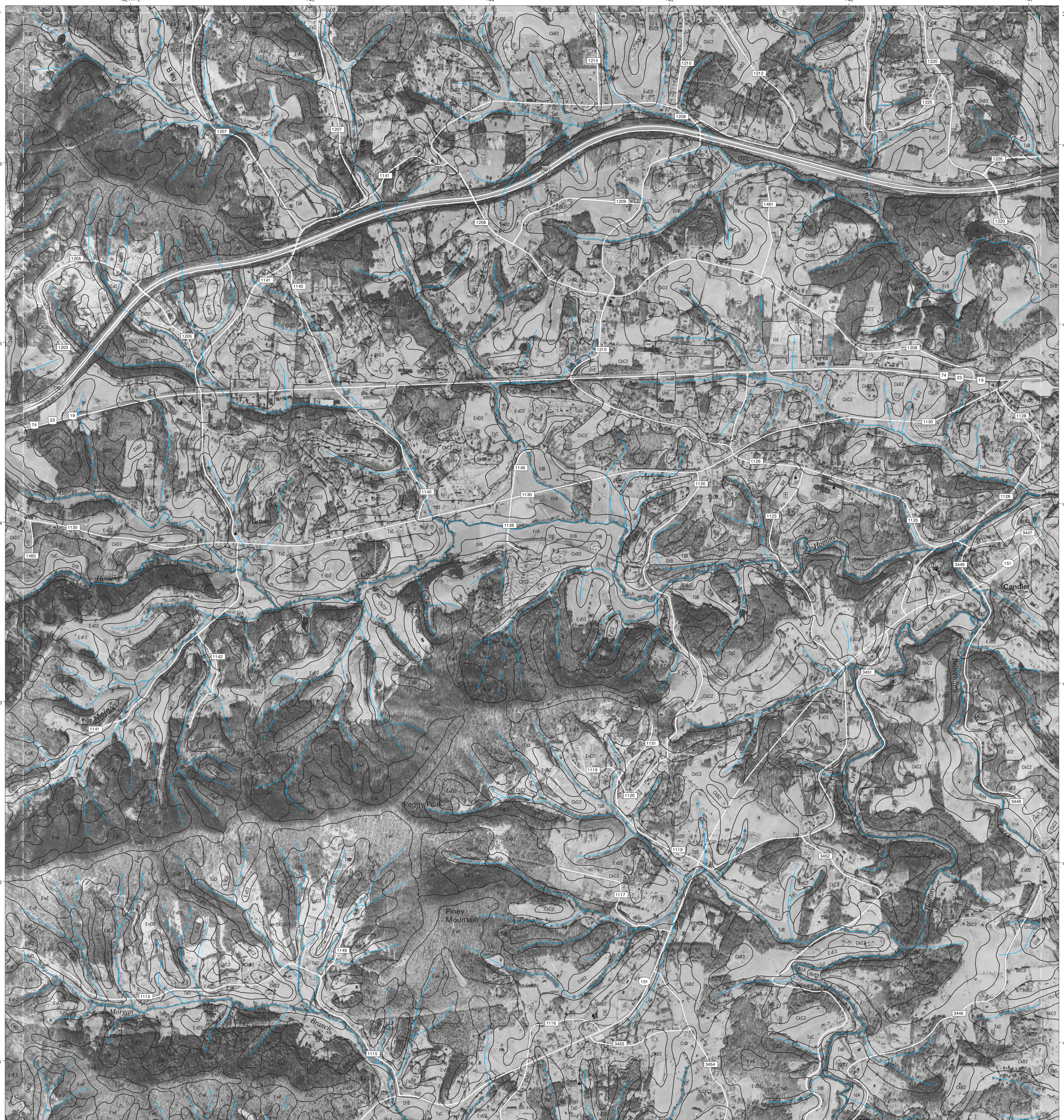
BUNCOMBE COUNTY, NORTH CAROLINA
ENKA SW QUADRANGLE
SHEET NUMBER 41 OF 64

Joins sheet 31, Canton NE

Joins sheet 32, Enka NW

Joins sheet 33, Enka NE



Joins sheet 40, Canton SE

Joins sheet 42, Enka SE

Joins sheet 51, Cruso NE

Joins sheet 52, Dunsmore Mountain NW

Joins sheet 53, Dunsmore Mountain NE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

31	32	33
40		42
51	52	53

31 CANTON NE
32 ENKA NW
33 ENKA NE
40 CANTON SE
42 ENKA SE
51 CRUSO NE
52 DUNSMORE MOUNTAIN NW
53 DUNSMORE MOUNTAIN NE

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ENKA SW, NORTH CAROLINA
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Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

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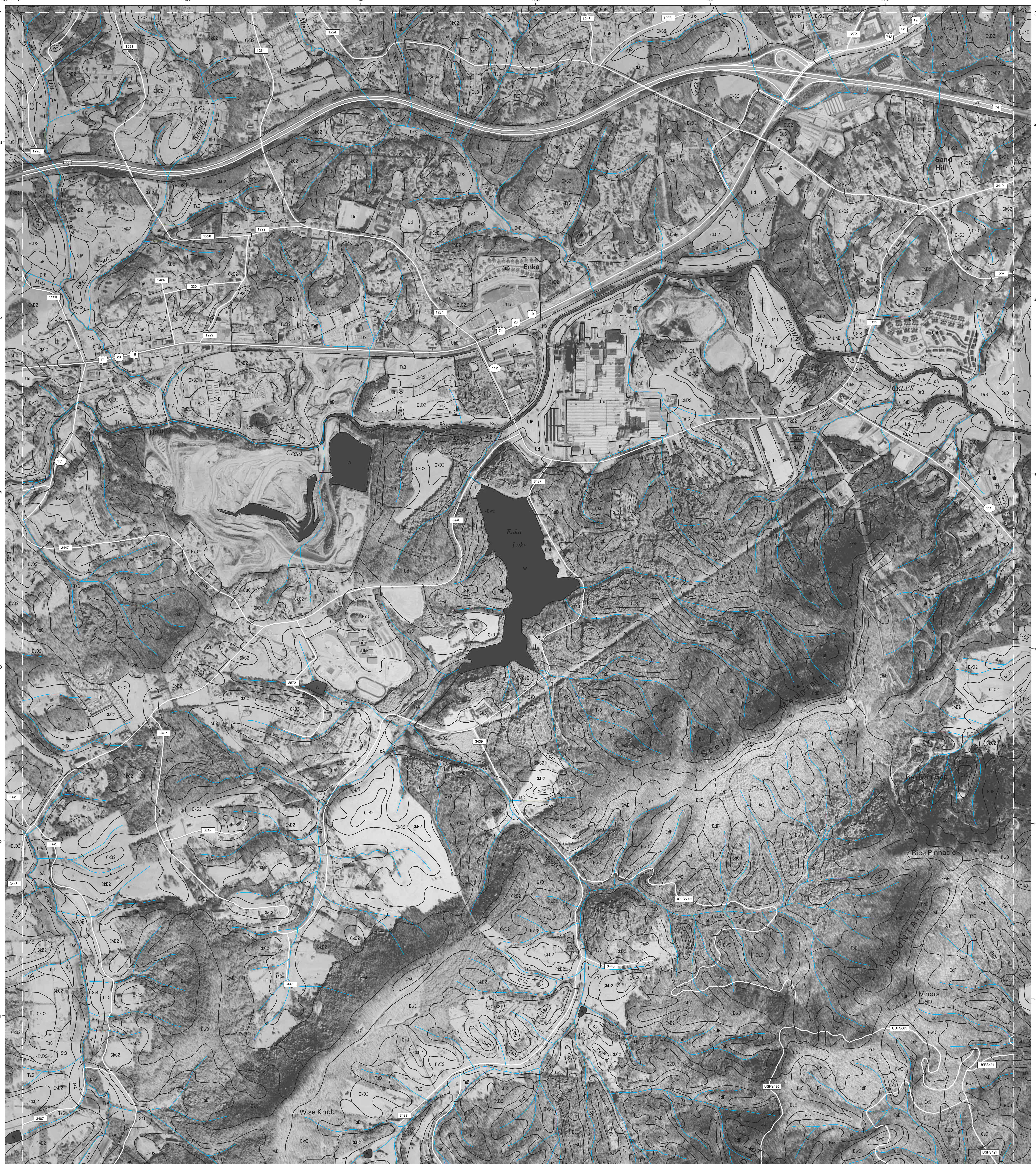
BUNCOMBE COUNTY, NORTH CAROLINA
ENKA SE QUADRANGLE
SHEET NUMBER 42 OF 64

Joins sheet 32, Enka NW

Joins sheet 33, Enka NE

Joins sheet 34, Asheville NW



Joins sheet 41, Enka SW

Joins sheet 43, Asheville SW

Joins sheet 52, Dunsmore Mountain NW

Joins sheet 53, Dunsmore Mountain NE

Joins sheet 54, Skyland NW

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE
LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

32	33	34
41		43
52	53	54

32 ENKA NW
33 ENKA NE
34 ASHEVILLE NW
41 ENKA SW
43 ASHEVILLE SW
52 DUNSMORE MOUNTAIN NW
53 DUNSMORE MOUNTAIN NE
54 SKYLAND NW

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ENKA SE, NORTH CAROLINA
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UNITED STATES
DEPARTMENT OF AGRICULTURE
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BUNCOMBE COUNTY, NORTH CAROLINA
ASHEVILLE SW QUADRANGLE
SHEET NUMBER 43 OF 64

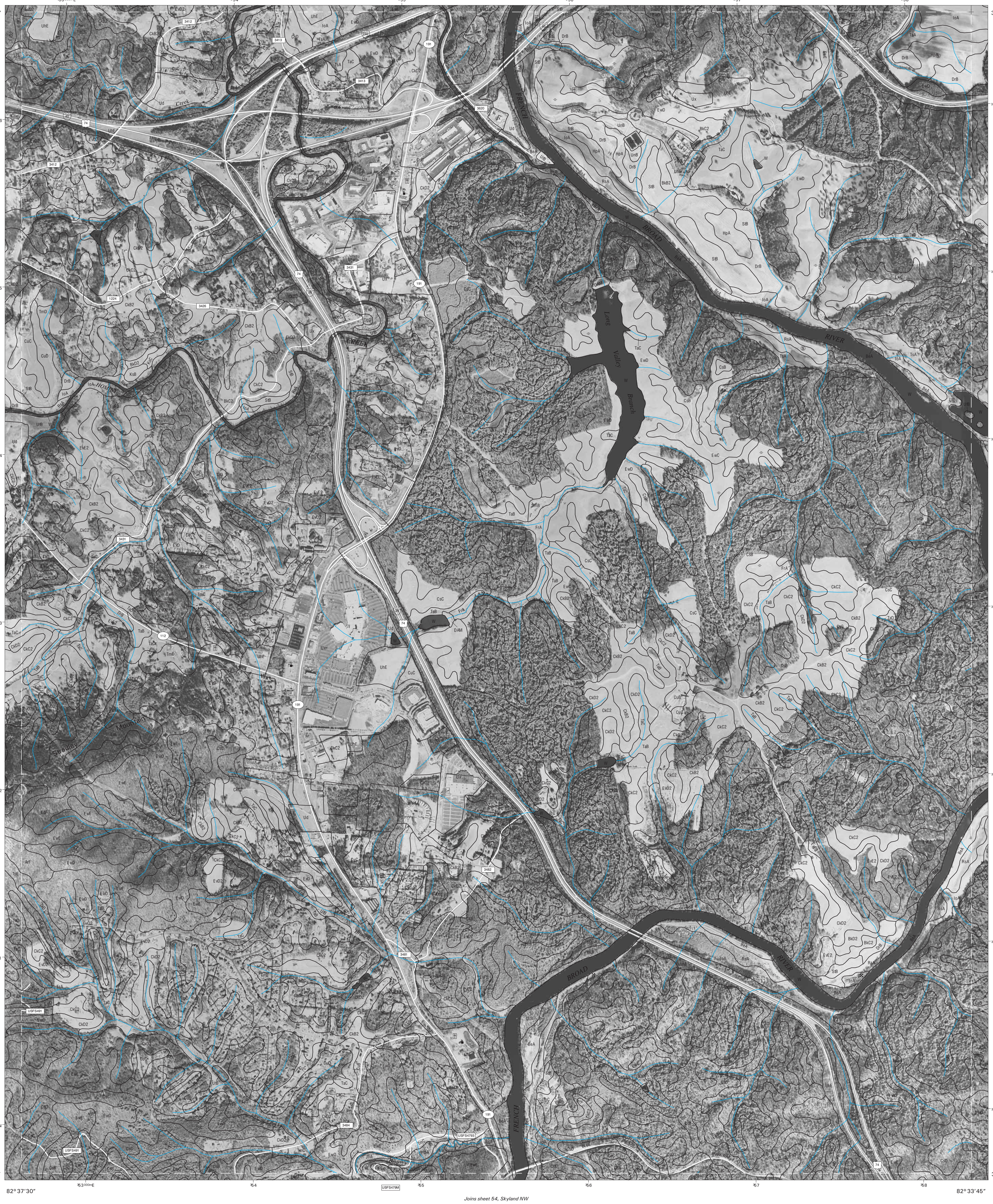
Joins sheet 33, Enka NE

Joins sheet 34, Asheville NW

Joins sheet 35, Asheville NE

82°37'30" 35°33'45"

82°33'45" 35°33'45"



Joins sheet 42, Enka SE

Joins sheet 44, Asheville SE

35°30'00" 82°37'30"

35°30'00" 82°33'45"

Joins sheet 54, Skyland NW

Joins sheet 53, Dunsmore Mountain NE

Joins sheet 55, Skyland NE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

33	34	35
42		44
53	54	55

33 ENKA NE
34 ASHEVILLE NW
35 ASHEVILLE NE
42 ENKA SE
44 ASHEVILLE SE
53 DUNSMORE MOUNTAIN NE
54 SKYLAND NW
55 SKYLAND NE

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ASHEVILLE SW, NORTH CAROLINA

3.75 MINUTE SERIES
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UNITED STATES
DEPARTMENT OF AGRICULTURE
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BUNCOMBE COUNTY, NORTH CAROLINA
ASHEVILLE SE QUADRANGLE
SHEET NUMBER 44 OF 64

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1998-1999 aerial photography. Hydrography and culture information were acquired from Natural Resources Conservation Service. Hydrography and cultural layers were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

34	35	36
43		45
54	55	56

34 ASHEVILLE NW
35 ASHEVILLE NE
36 OTEEN NW
43 ASHEVILLE SW
45 OTEEN SW
54 SKYLAND NW
55 SKYLAND NE
56 FRUITLAND NW

INDEX TO ADJOINING 3.75 MAPS

ASHEVILLE SE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 44 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
OTEEN SW QUADRANGLE
SHEET NUMBER 45 OF 64

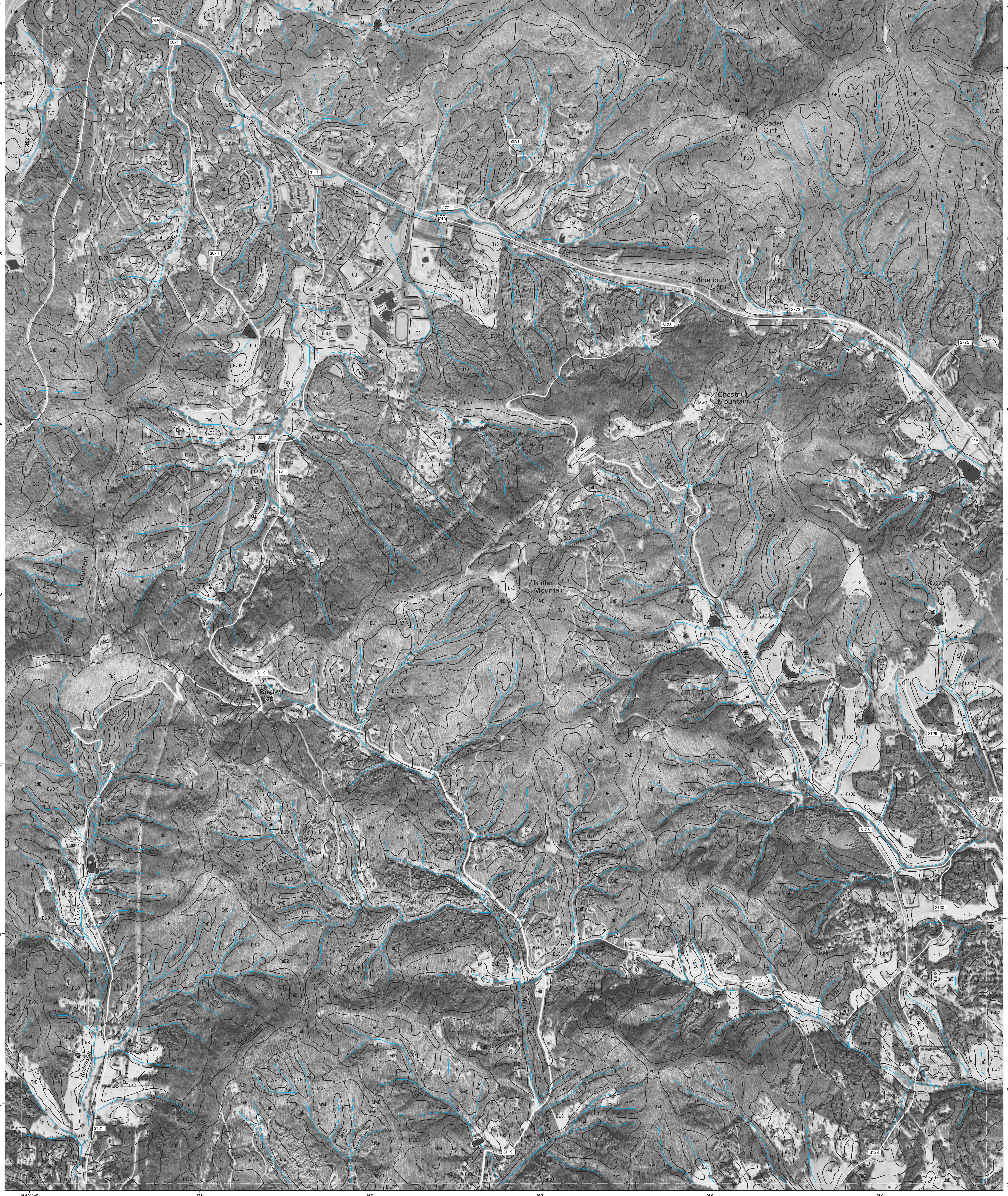
Joins sheet 35, Asheville NE

Joins sheet 36, Oteen NW

Joins sheet 37, Oteen NE

82° 30′00″ — 82° 26′15″

35° 33′45″



Joins sheet 44, Asheville SE

Joins sheet 46, Oteen SE

35° 30′00″

364000mE 365 366 367 368 369

82° 30′00″ — 82° 26′15″

Joins sheet 55, Skyland NE

Joins sheet 56, Fruitland NW

Joins sheet 57, Fruitland NE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5 MILES

500 0 500 1000 1500 2000 2500 3000 3500 FEET

0.5 0 0.5 KILOMETERS

35	36	37
44		46
55	56	57

35 ASHEVILLE NE
36 OTEEN NW
37 OTEEN NE
44 ASHEVILLE SE
46 OTEEN SE
55 SKYLAND NE
56 FRUITLAND NW
57 FRUITLAND NE

INDEX TO ADJOINING 3.75 MAPS

OTEEN SW, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 45 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

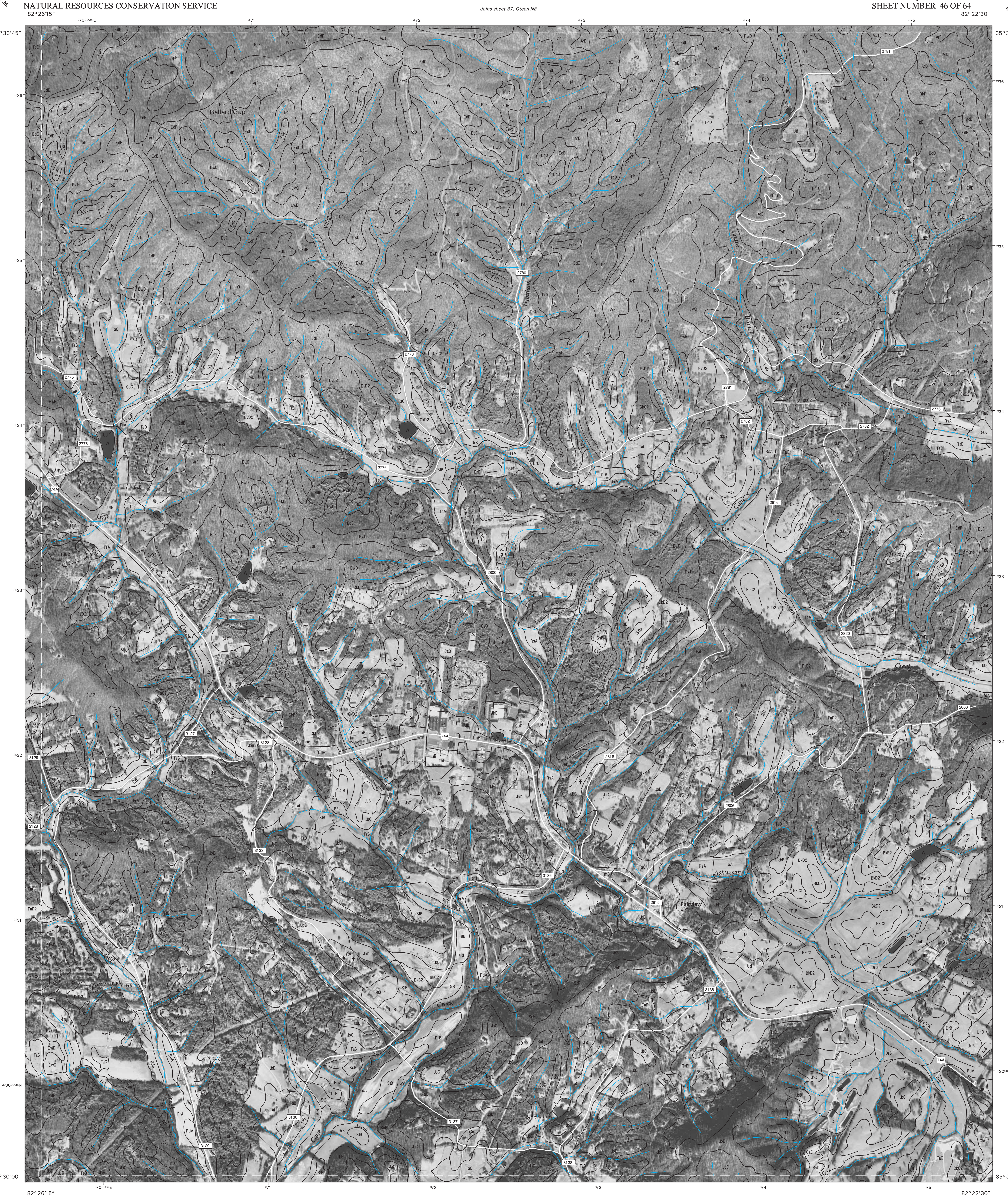
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
OTEEN SE QUADRANGLE
SHEET NUMBER 46 OF 64

Joins sheet 36, Oteen NW

Joins sheet 37, Oteen NE

Joins sheet 38, Black Mountain NW



Joins sheet 45, Oteen SW

Joins sheet 47, Black Mountain SW

Joins sheet 56, Fruitland NW

Joins sheet 57, Fruitland NE

Joins sheet 58, Bat Cave NW

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

36	37	38
45		47
56	57	58

36 OTEEN NW
37 OTEEN NE
38 BLACK MOUNTAIN NW
45 OTEEN SW
47 BLACK MOUNTAIN SW
56 FRUITLAND NW
57 FRUITLAND NE
58 BAT CAVE NW

INDEX TO ADJOINING 3.75 MAPS

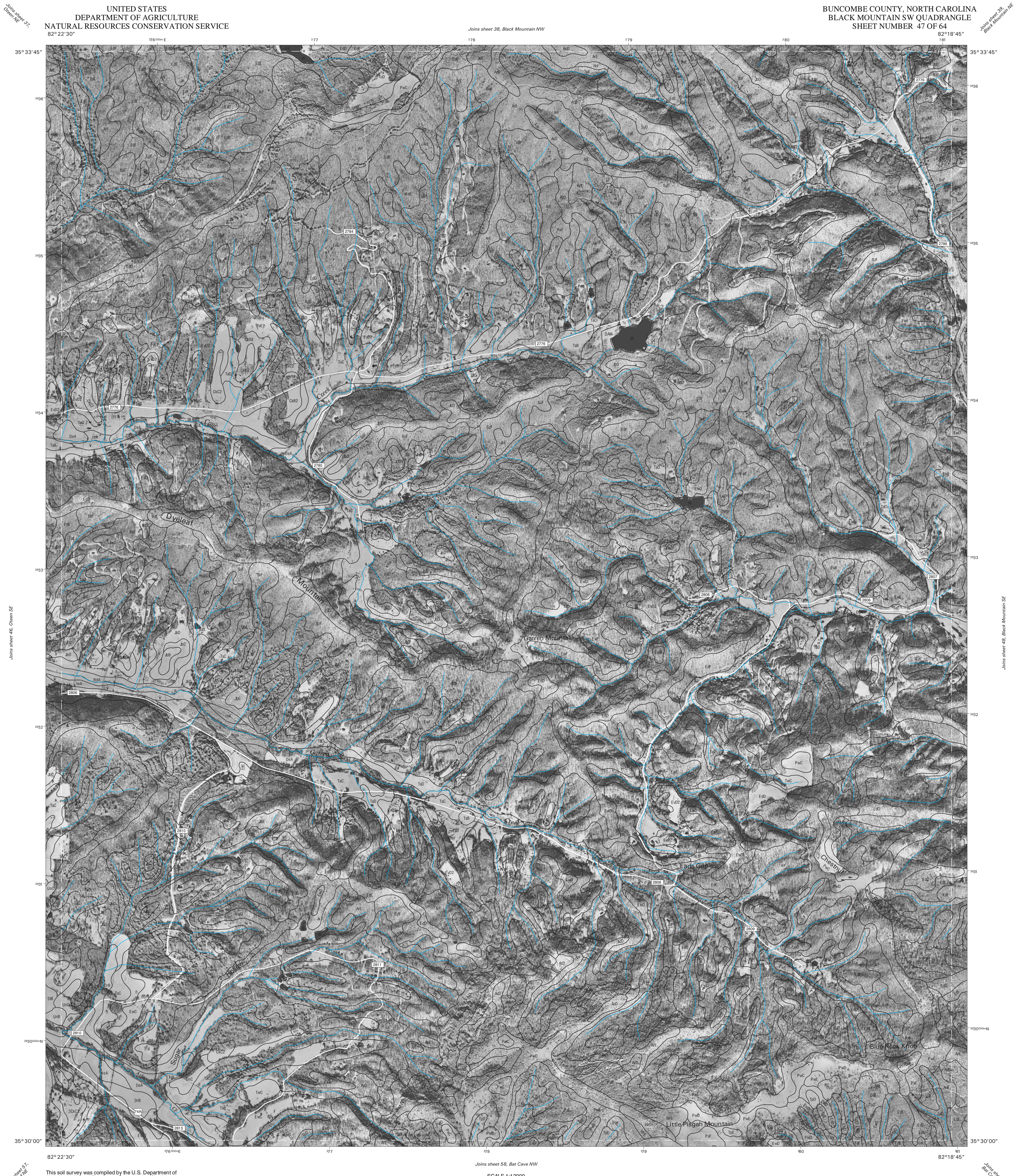
OTEEN SE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 46 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
BLACK MOUNTAIN SW QUADRANGLE
SHEET NUMBER 47 OF 64



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

37	38	39
46		48
57	58	59

37 OTEEN NE
38 BLACK MOUNTAIN NW
39 BLACK MOUNTAIN NE
46 OTEEN SE
48 BLACK MOUNTAIN SE
57 FRUITLAND NE
58 BAT CAVE NW
59 BAT CAVE NE

INDEX TO ADJOINING 3.75 MAPS

BLACK MOUNTAIN SW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 47 OF 64

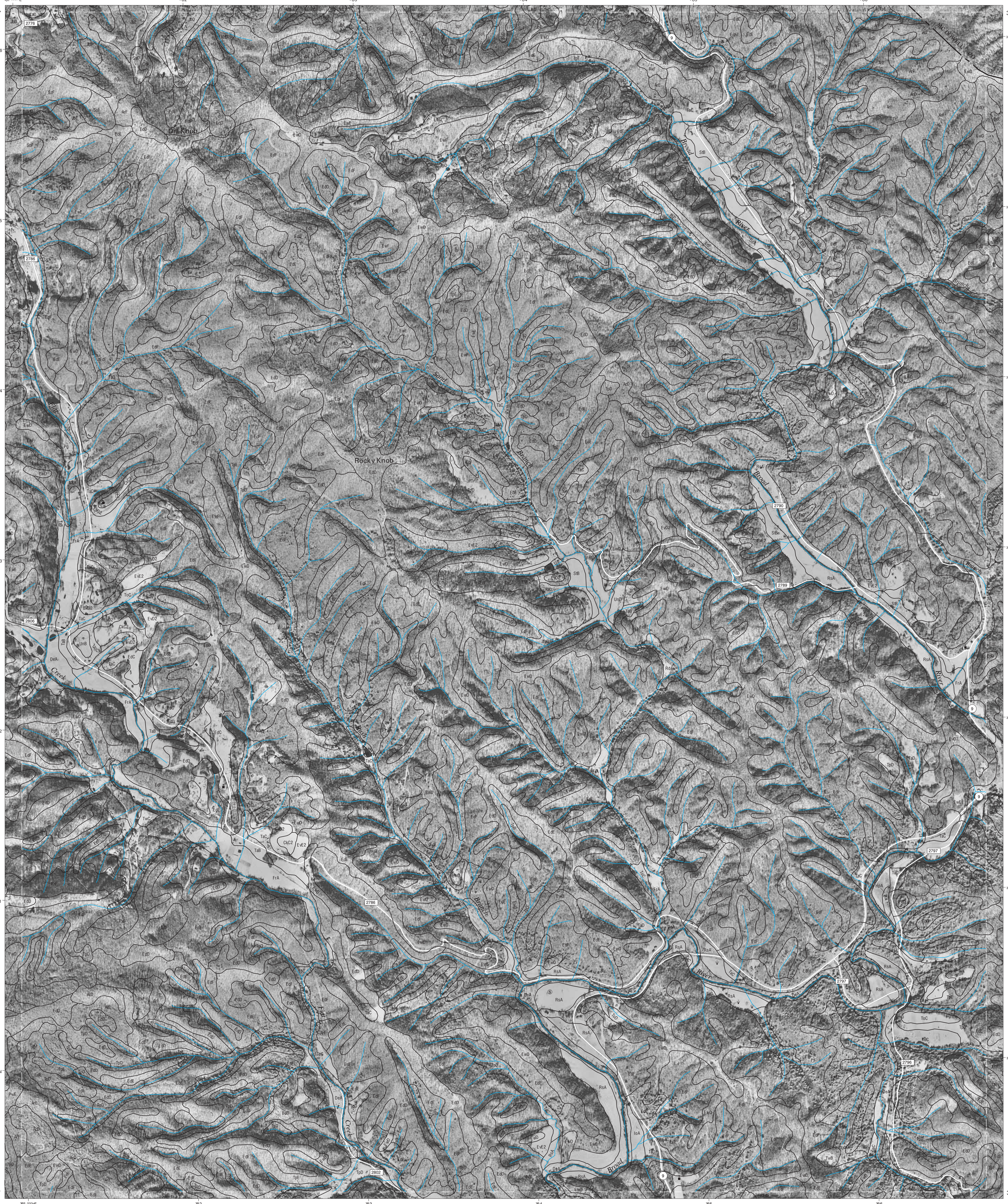
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
BLACK MOUNTAIN SE QUADRANGLE
SHEET NUMBER 48 OF 64

Joins sheet 38, Black Mountain NW

Joins sheet 39, Black Mountain NE



Joins sheet 47, Black Mountain SW

Joins sheet 49, Moffitt Hill SW

Joins sheet 58, Bat Cave NW

Joins sheet 59, Bat Cave NE

Joins sheet 60, Lake Lure NW

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

38	39	
47		49
58	59	60

38 BLACK MOUNTAIN NW
39 BLACK MOUNTAIN NE
47 BLACK MOUNTAIN SW
49 MOFFITT HILL SW
58 BAT CAVE NW
59 BAT CAVE NE
60 LAKE LURE NW

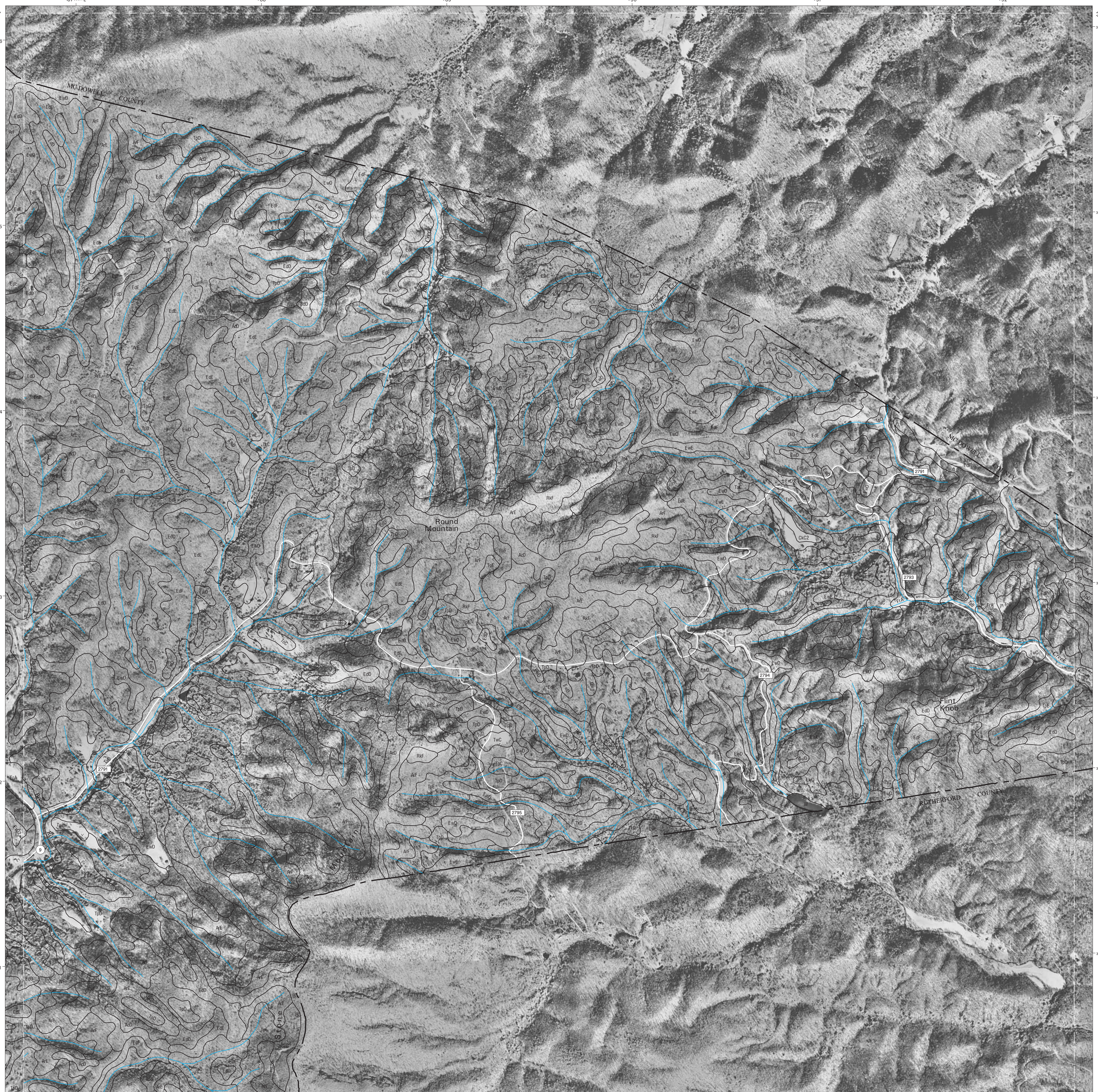
INDEX TO ADJOINING 3.75 MAPS

BLACK MOUNTAIN SE, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 48 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

Joins sheet 39, Black Mountain NE



Joins sheet 59, Bat Cave NE

Joins sheet 60, Lake Lure NW

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

INDEX TO ADJOINING 3.75 MAPS

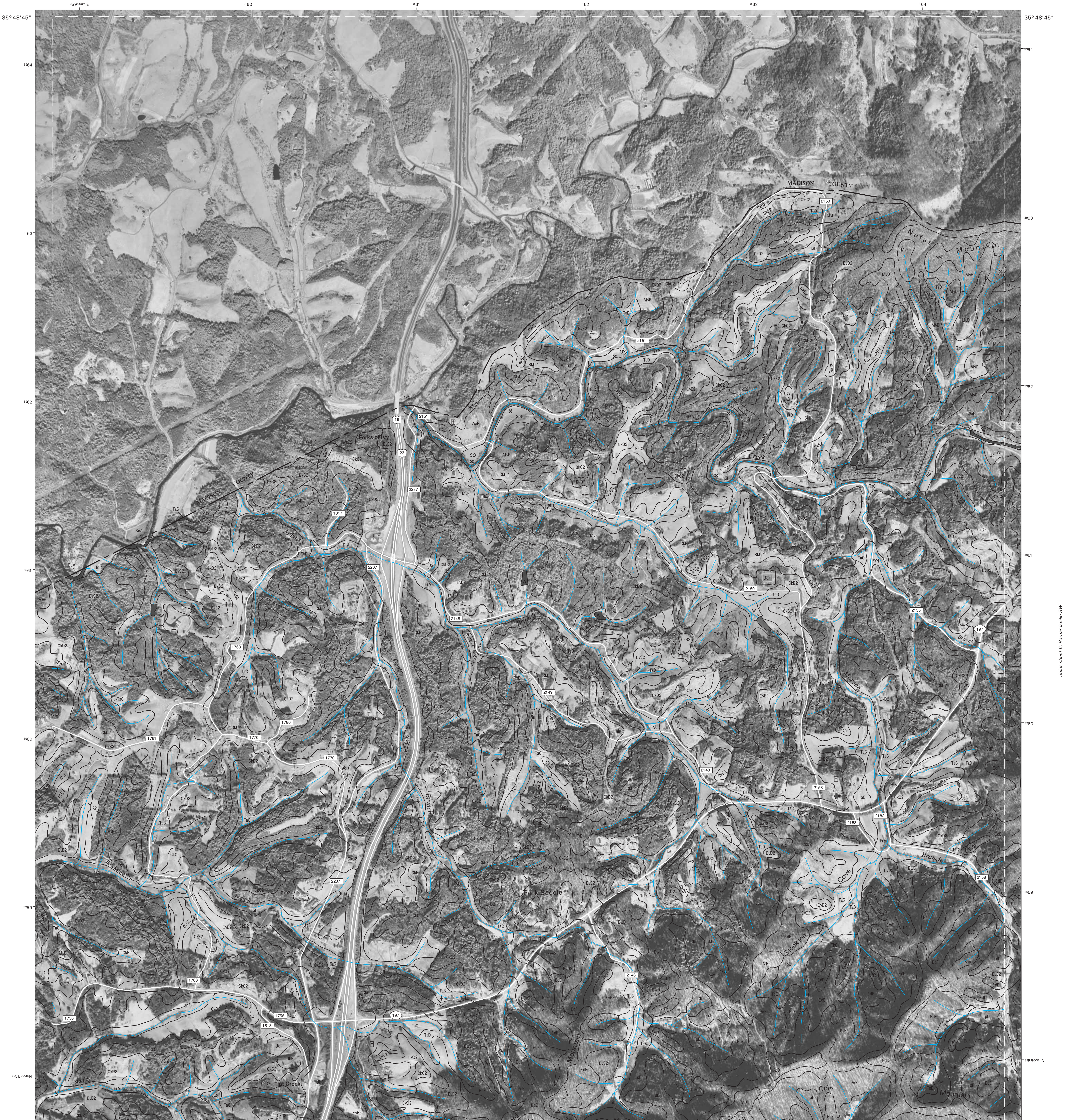
39 BLACK MOUNTAIN NE
48 BLACK MOUNTAIN SE
50 MOFFITT HILL SE
59 BAT CAVE NE
60 LAKE LURE NW

MOFFITT HILL SW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 49 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
MARS HILL SE QUADRANGLE
SHEET NUMBER 5 OF 64



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

4	■	6
13	14	15

4 MARS HILL SW
6 BARNARDSVILLE SW
13 WEAVERVILLE NW
14 WEAVERVILLE NE
15 CRAGGY PINNACLE NW

INDEX TO ADJOINING 3.75 MAPS

MARS HILL SE, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 5 OF 64

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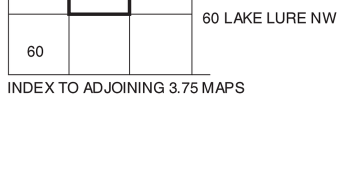
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

QUARTER QUADRANGLE LOCATION

SCALE 1:12000



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MOFFITT HILL SE, NORTH CAROLINA

3.75 MINUTE SERIES

SHEET NUMBER 50 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

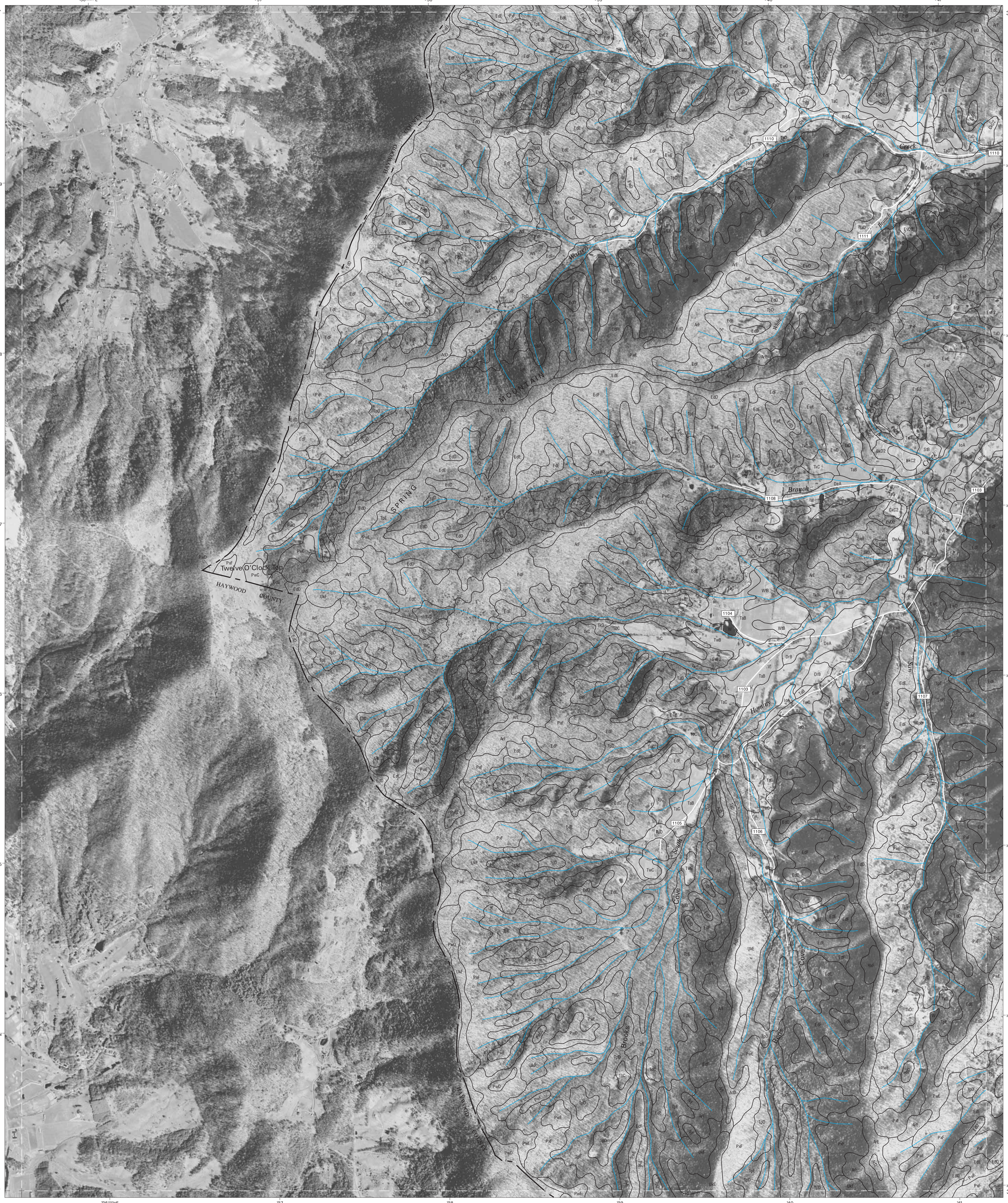
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
CRUSO NE QUADRANGLE
SHEET NUMBER 51 OF 64

Joins sheet 41, Enka SW

Joins sheet 40, Canton SE

82° 48′45″ — 82° 45′00″
35° 30′00″



Joins sheet 52, Dunsmore Mountain NW

35° 26′15″
82° 48′45″ — 82° 45′00″

Joins sheet 61, Cruso SE

Joins sheet 62, Dunsmore Mountain SW

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 — 0 — 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 — 0 — 0.5

	40	41
	■	52
	61	62

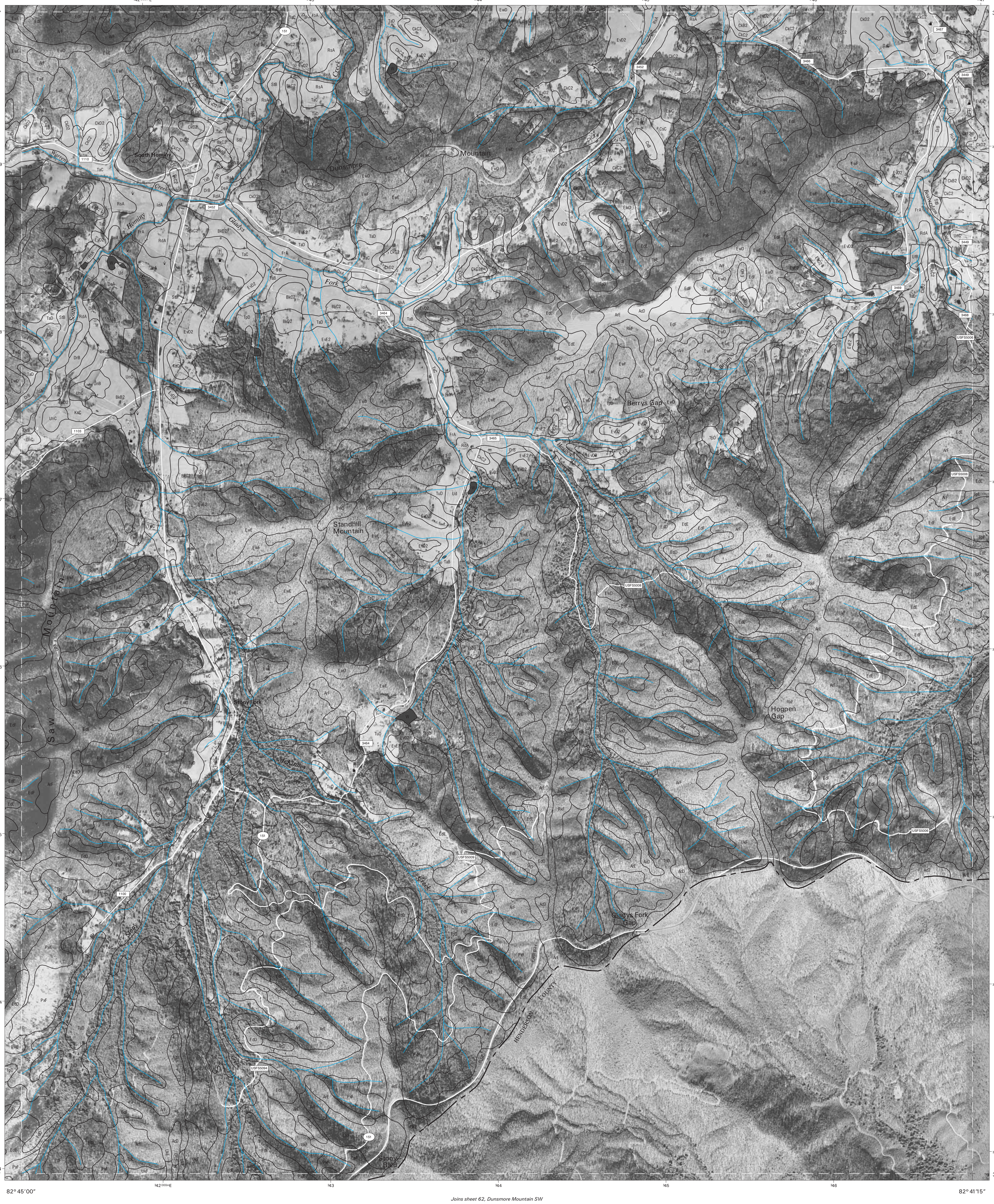
40 CANTON SE
41 ENKA SW
52 DUNSMORE MOUNTAIN NW
61 CRUSO SE
62 DUNSMORE MOUNTAIN SW

INDEX TO ADJOINING 3.75 MAPS

CRUSO NE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 51 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

40	41	42
51		53
61	62	

40 CANTON SE
41 ENKA SW
42 ENKA SE
51 CRUSO NE
53 DUNSMORE MOUNTAIN NE
61 CRUSO SE
62 DUNSMORE MOUNTAIN SW

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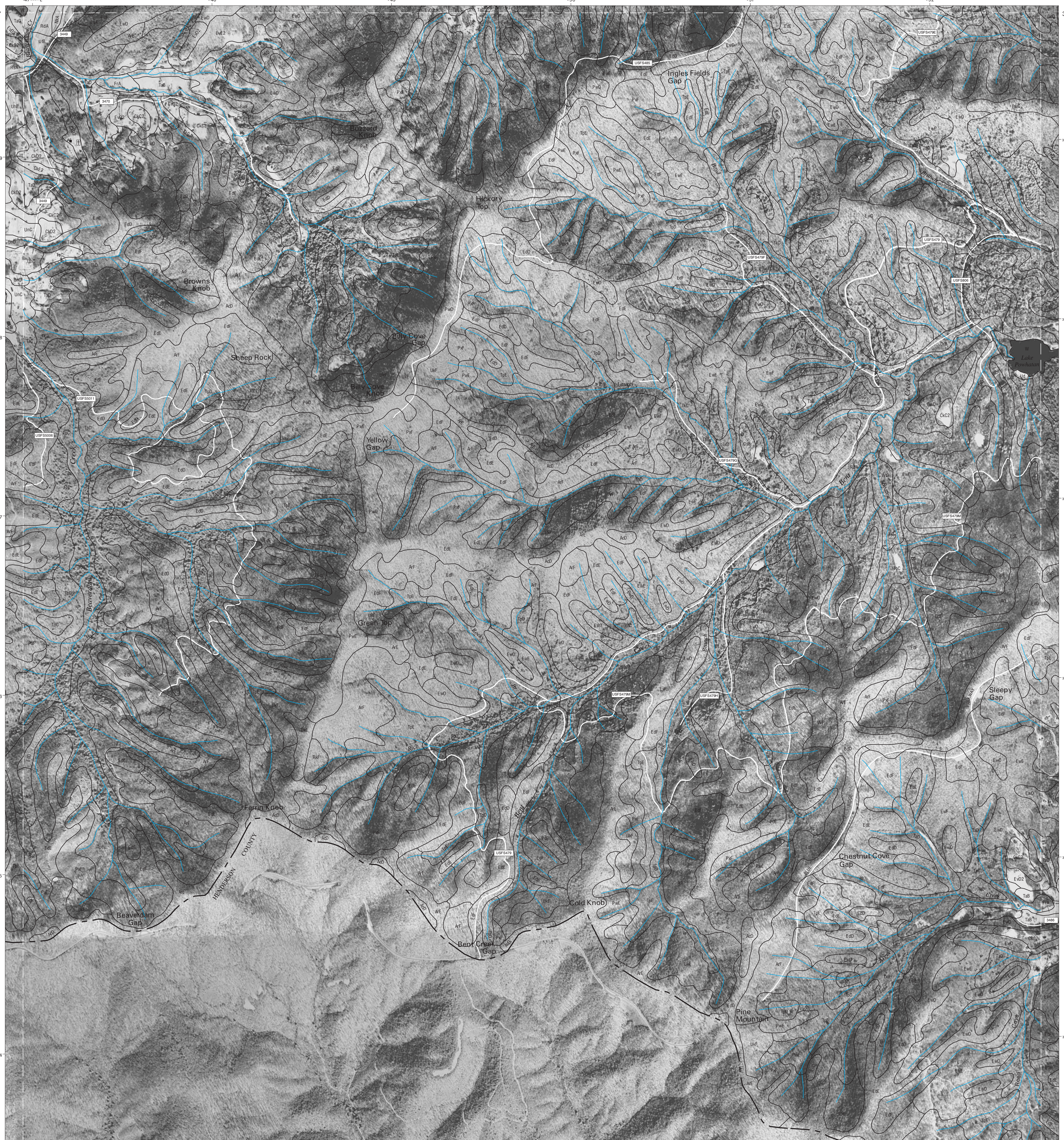
DUNSMORE MOUNTAIN NW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 52 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

Joins sheet 41, Enka SW
Joins sheet 42, Enka SE
Joins sheet 43, Asheville SW
Joins sheet 52, Dunsmore Mountain NW
Joins sheet 54, Skyland NW
Joins sheet 62, Dunsmore Mountain SW
Joins sheet 63, Skyland SW



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NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

41	42	43
52		54
62		63

41 ENKA SW
42 ENKA SE
43 ASHEVILLE SW
52 DUNSMORE MOUNTAIN NW
54 SKYLAND NW
62 DUNSMORE MOUNTAIN SW
63 SKYLAND SW

INDEX TO ADJOINING 3.75 MAPS

DUNSMORE MOUNTAIN NE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 53 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

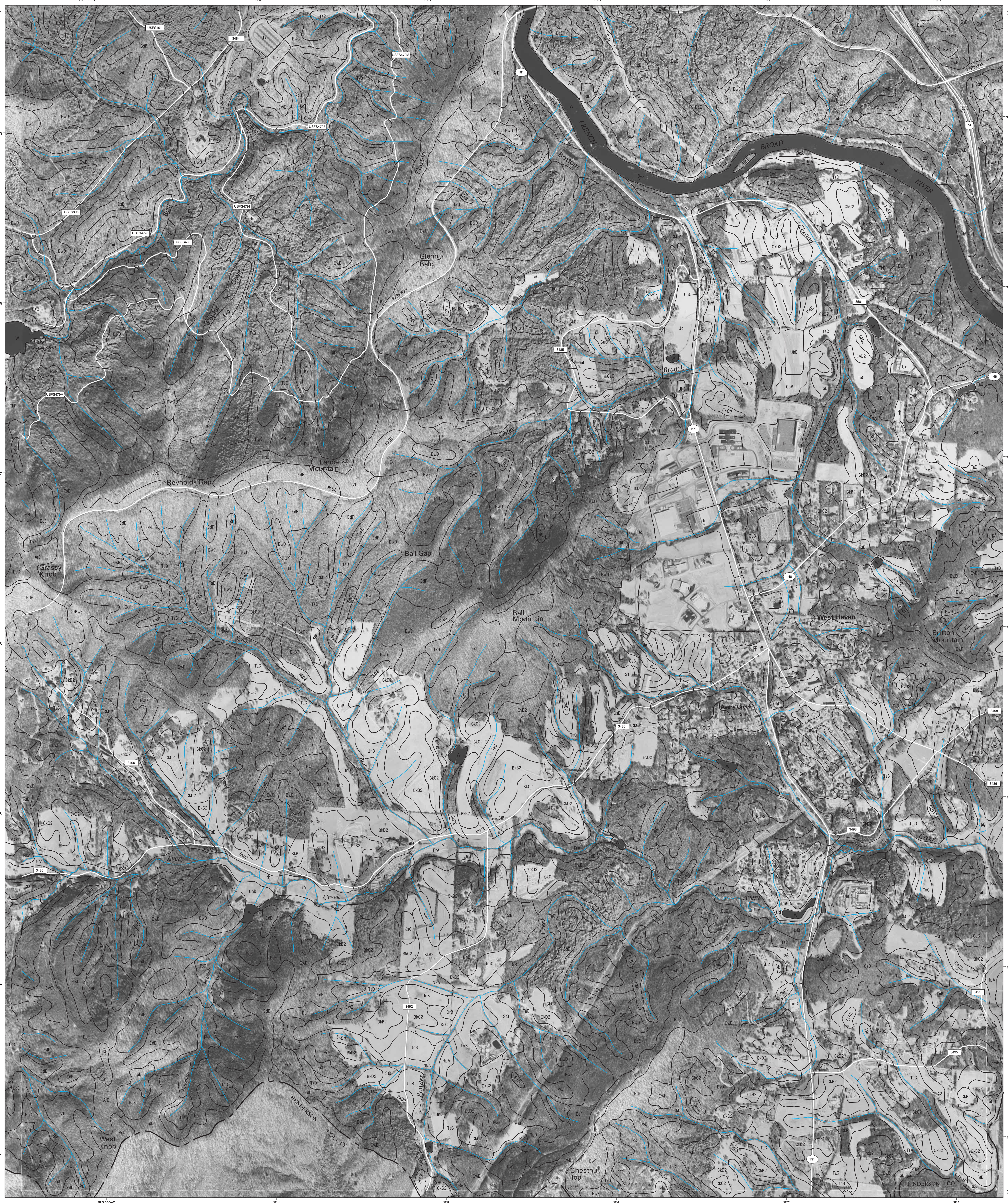
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
SKYLAND NW QUADRANGLE
SHEET NUMBER 54 OF 64

Joins sheet 42, Enka SE

Joins sheet 43, Asheville SW

Joins sheet 44, Asheville SE



Joins sheet 53, Dunsmore Mountain NE

Joins sheet 55, Skyland NE

Joins sheet 63, Skyland SW

Joins sheet 64, Skyland SE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

42	43	44
53		55
	63	64

42 ENKA SE
43 ASHEVILLE SW
44 ASHEVILLE SE
53 DUNSMORE MOUNTAIN NE
55 SKYLAND NE
63 SKYLAND SW
64 SKYLAND SE

INDEX TO ADJOINING 3.75 MAPS

SKYLAND NW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 54 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1998-1999 aerial photography. Hydrography and culture information were acquired from Natural Resources Conservation Service. Hydrography and cultural layers were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

43	44	45
54		56
63	64	

43 ASHEVILLE SW
44 ASHEVILLE SE
45 OTEEN SW
54 SKYLAND NW
56 FRUITLAND NW
63 SKYLAND SW
64 SKYLAND SE

INDEX TO ADJOINING 3.75 MAPS

SKYLAND NE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 55 OF 64

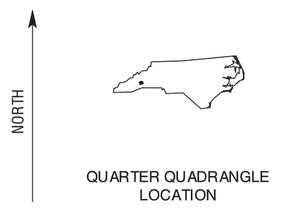
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

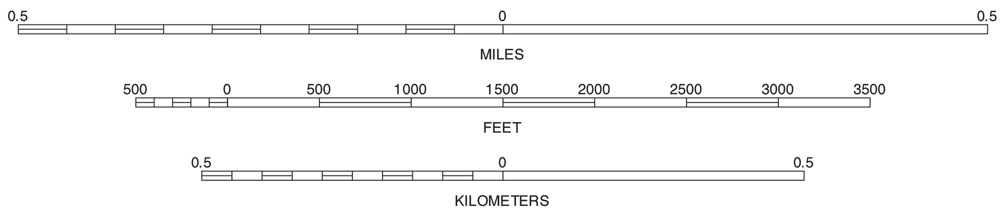
BUNCOMBE COUNTY, NORTH CAROLINA
FRUITLAND NW QUADRANGLE
SHEET NUMBER 56 OF 64

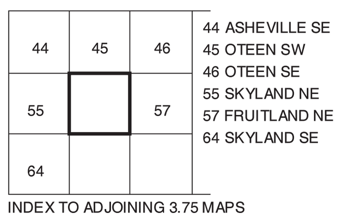
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1998-1999 aerial photography. Hydrography and culture information were acquired from Natural Resources Conservation Service. Hydrography and cultural layers were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



SCALE 1:12000





FRUITLAND NW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 56 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
FRUITLAND NE QUADRANGLE
SHEET NUMBER 57 OF 64

Joins sheet 45, Oteen SW

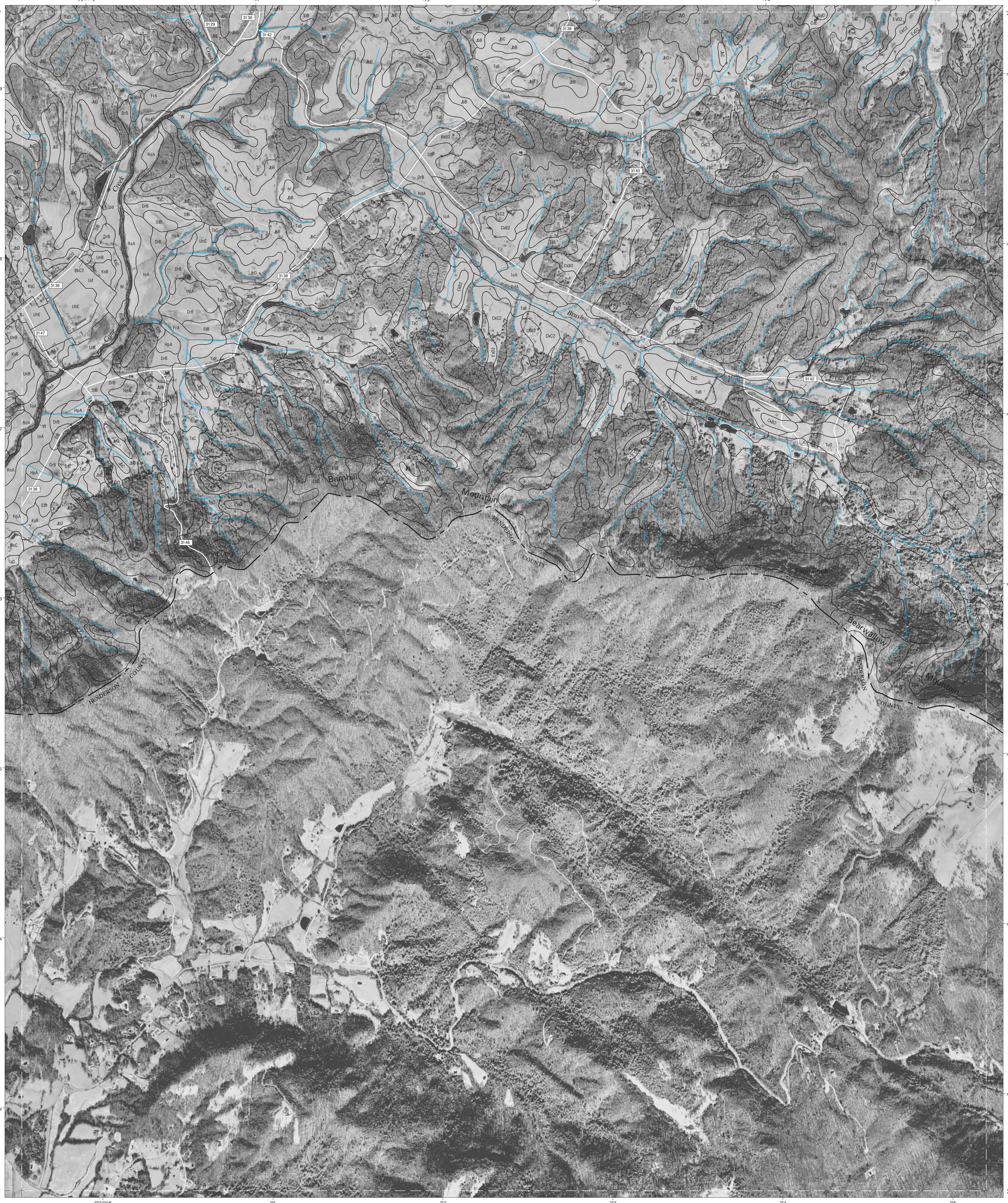
Joins sheet 46, Oteen SE

Joins sheet 47, Black Mountain SW

82° 26'15"

82° 22'30"

35° 30'00"



Joins sheet 56, Fruitland NW

Joins sheet 58, Bat Cave NW

35° 26'15"

82° 26'15"

82° 22'30"

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

45 OTEEN SW
46 OTEEN SE
47 BLACK MOUNTAIN SW
56 FRUITLAND NW
58 BAT CAVE NW

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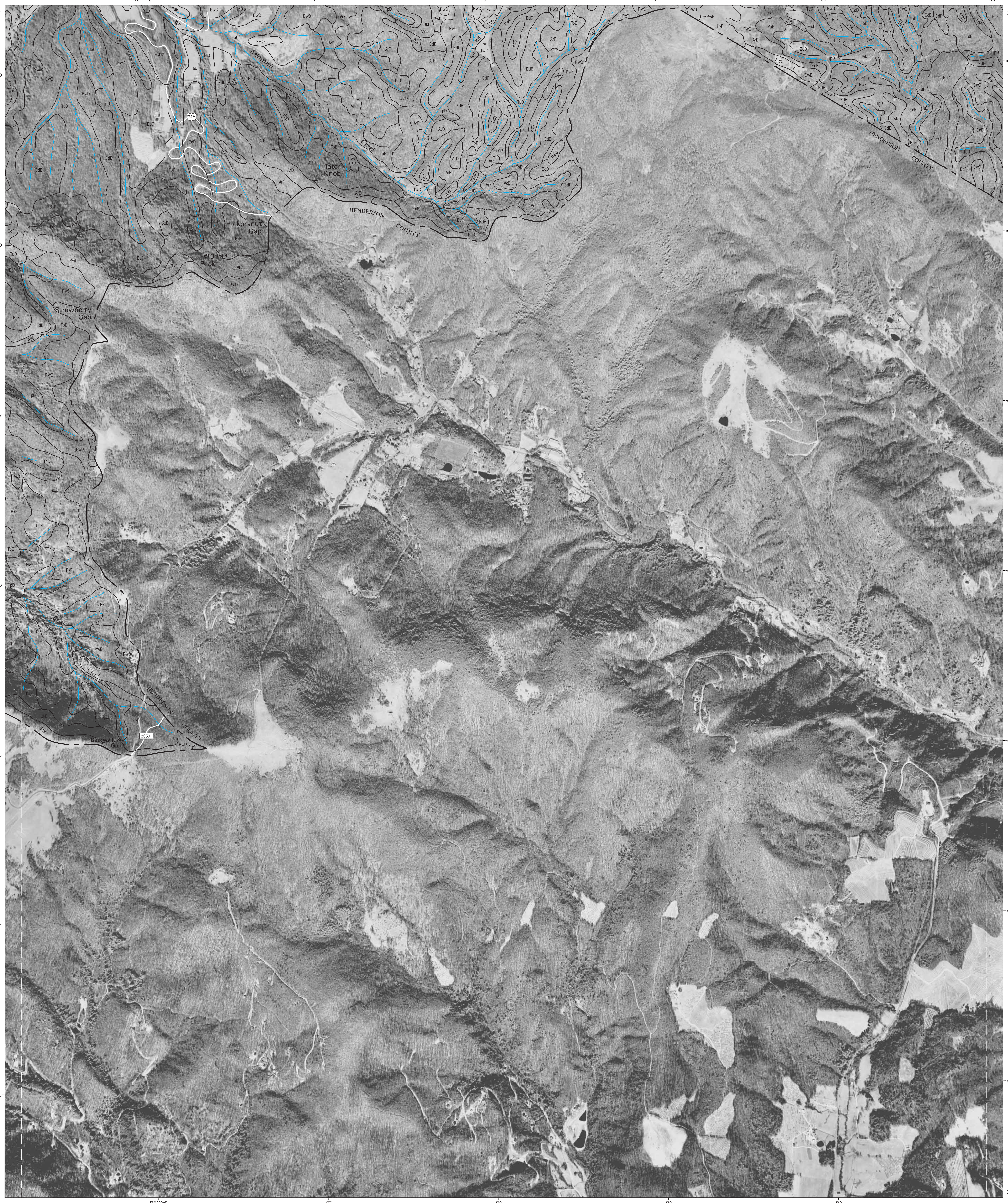
FRUITLAND NE, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 57 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
BAT CAVE NW QUADRANGLE
SHEET NUMBER 58 OF 64



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

46	47	48
57		59

46 OTEEN SE
47 BLACK MOUNTAIN SW
48 BLACK MOUNTAIN SE
57 FRUITLAND NE
59 BAT CAVE NE

INDEX TO ADJOINING 3.75 MAPS

BAT CAVE NW, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 58 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
BAT CAVE NE QUADRANGLE
SHEET NUMBER 59 OF 64

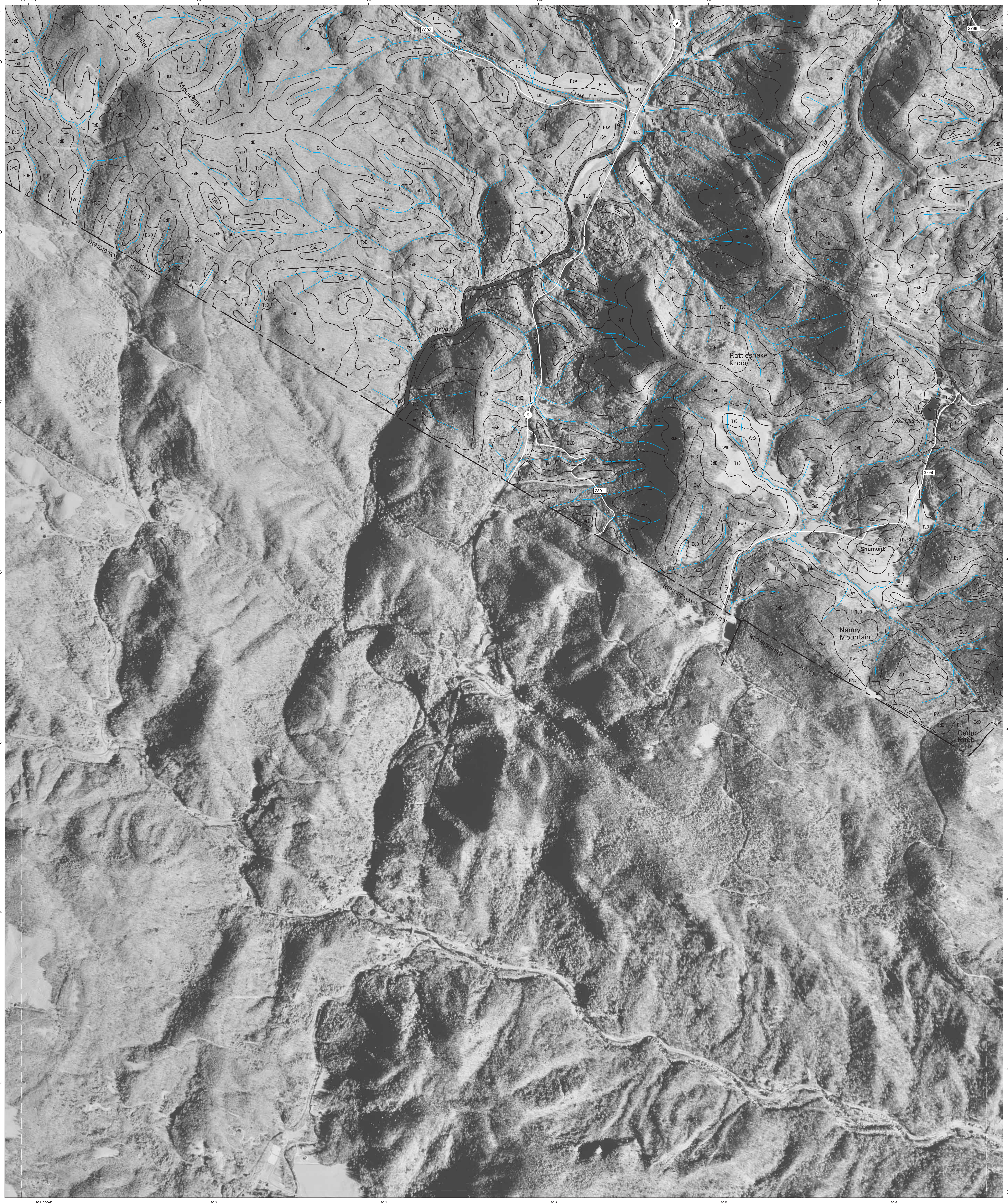
Joins sheet 47, Black Mountain SW

Joins sheet 48, Black Mountain SE

Joins sheet 49, Moffitt Hill SW

Joins sheet 58, Bat Cave NW

Joins sheet 60, Lake Lure NW



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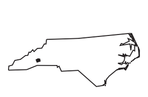
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

47	48	49
58		60

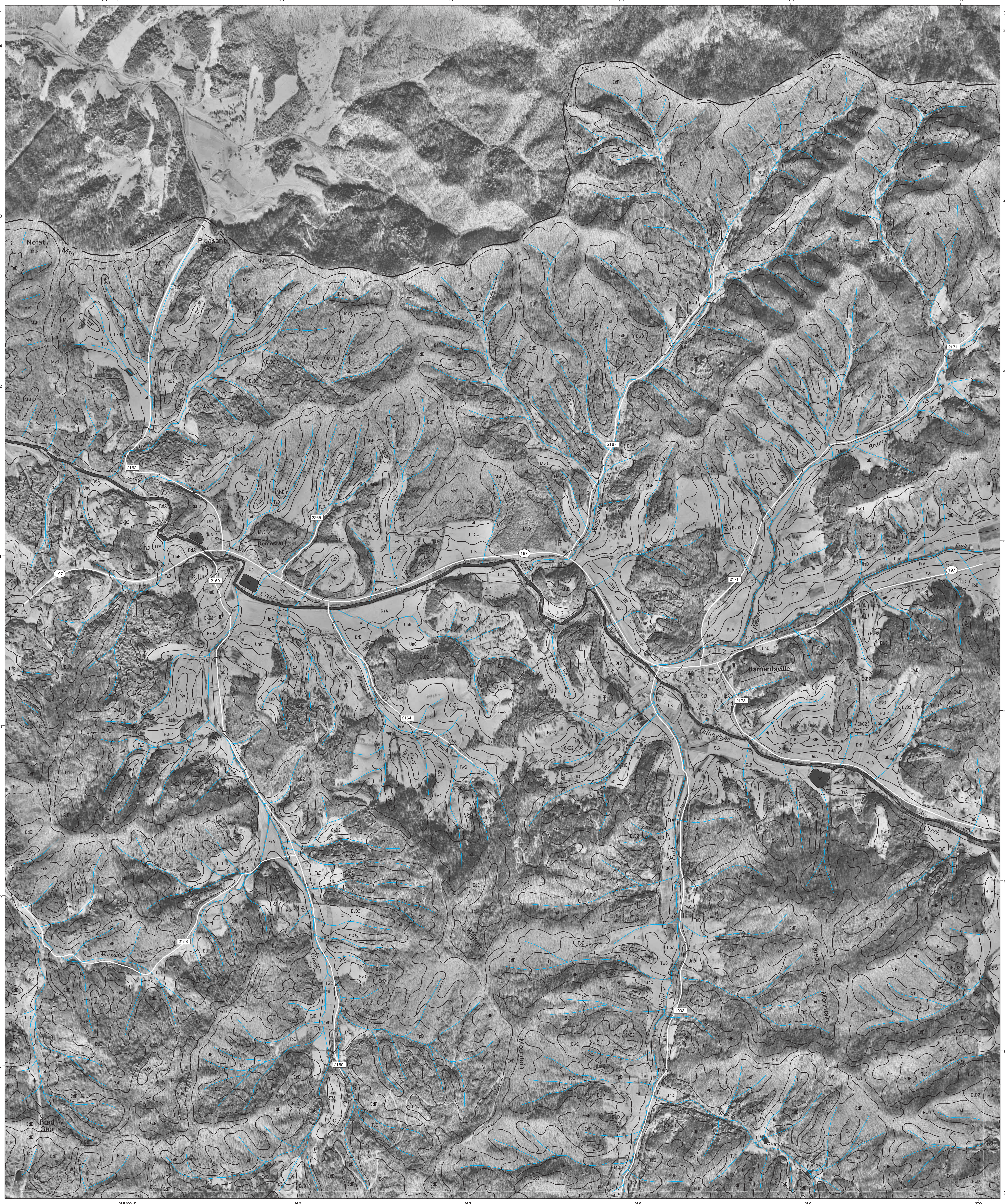
47 BLACK MOUNTAIN SW
48 BLACK MOUNTAIN SE
49 MOFFITT HILL SW
58 BAT CAVE NW
60 LAKE LURE NW

INDEX TO ADJOINING 3.75 MAPS

BAT CAVE NE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 59 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

		1
5		7
14	15	16

1 BARNARDSVILLE NE
5 MARS HILL SE
7 BARNARDSVILLE SE
14 WEAVERVILLE NE
15 CRAGGY PINNACLE NW
16 CRAGGY PINNACLE NE

INDEX TO ADJOINING 3.75 MAPS

BARNARDSVILLE SW, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 6 OF 64

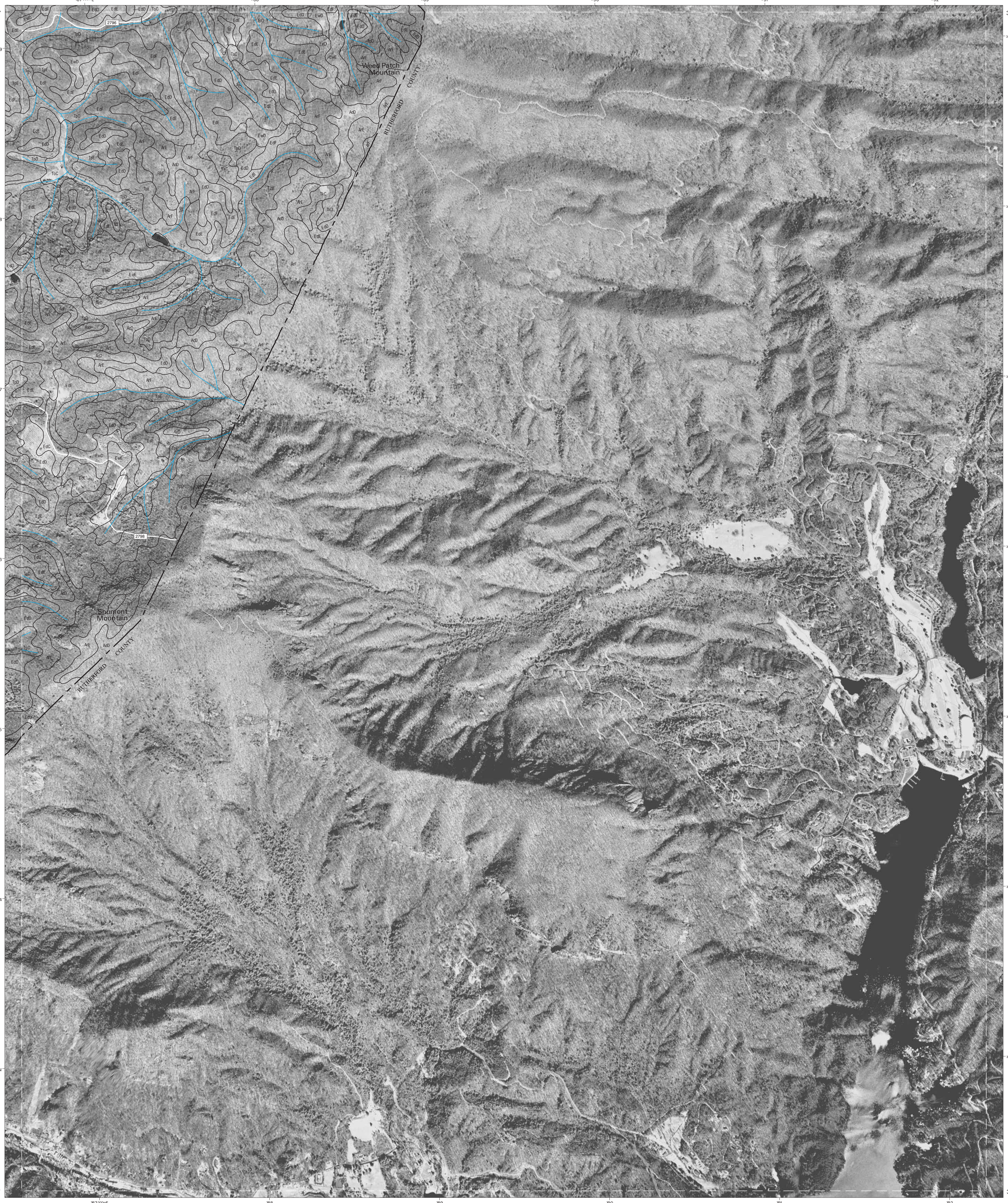
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

Joins sheet 48, Black Mountain SE

Joins sheet 49, Moffitt Hill SW

Joins sheet 50, Moffitt Hill SE

Joins sheet 59, Bat Cave NE



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

48	49	50
59		

48 BLACK MOUNTAIN SE
49 MOFFITT HILL SW
50 MOFFITT HILL SE
59 BAT CAVE NE

INDEX TO ADJOINING 3.75 MAPS

LAKE LURE NW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 60 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
CRUSO SE QUADRANGLE
SHEET NUMBER 61 OF 64

Joins sheet 51, Cruso NE

Joins sheet 52, Dunsmore Mountain NW

82° 48′45″ — 35° 26′15″ — 82° 45′00″ — 35° 26′15″

Joins sheet 62, Dunsmore Mountain SW

35° 22′30″ — 82° 48′45″ — 35° 22′30″ — 82° 45′00″

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

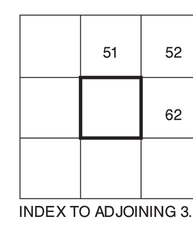
QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5



51 CRUSO NE
52 DUNSMORE MOUNTAIN NW
62 DUNSMORE MOUNTAIN SW

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CRUSO SE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 61 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

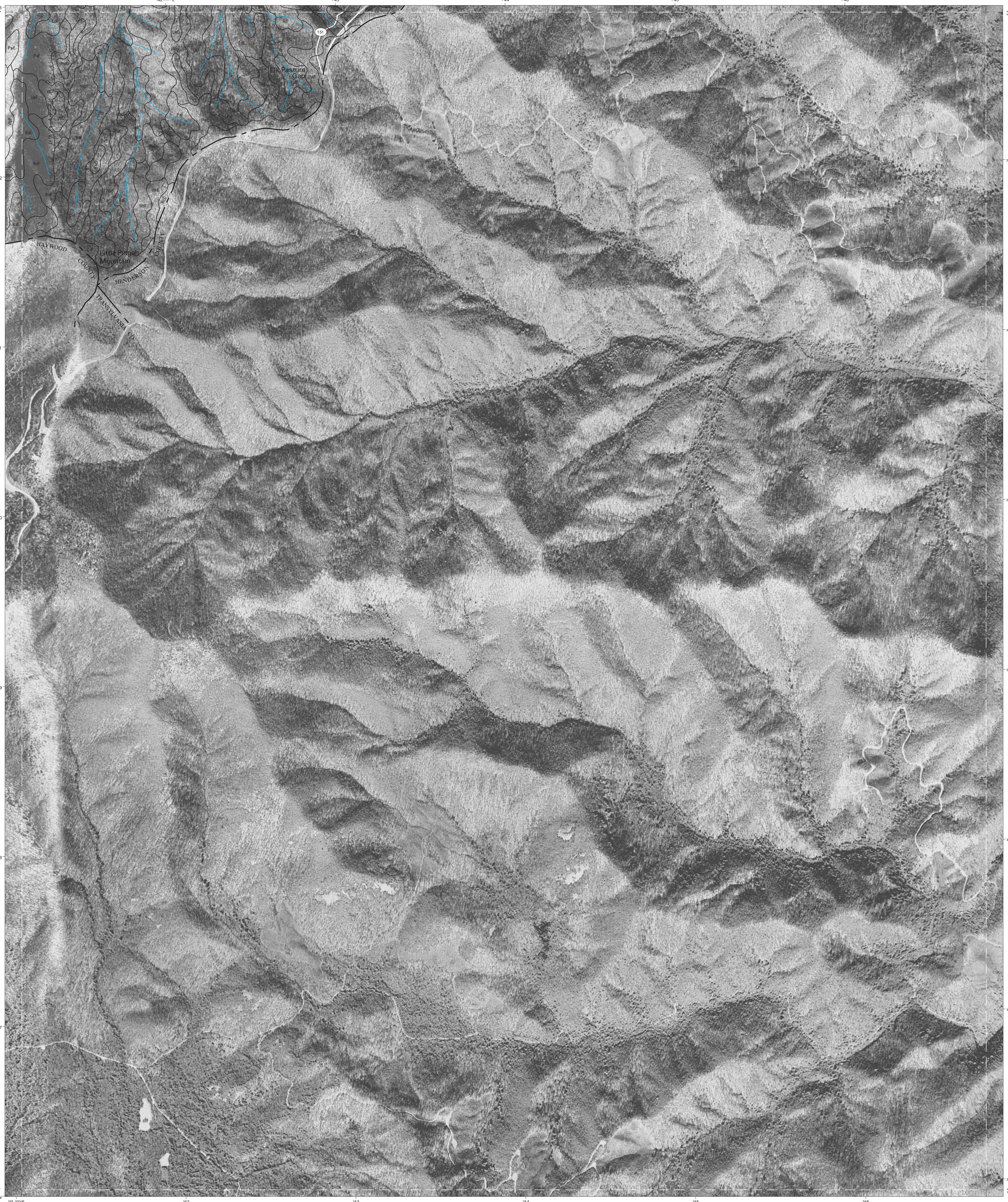
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

Joins sheet 51, Cruso NE

Joins sheet 52, Dunsmore Mountain NW

Joins sheet 53, Dunsmore Mountain NE

Joins sheet 61, Cruso SE



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

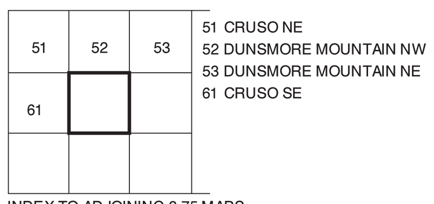
QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS



INDEX TO ADJOINING 3.75 MAPS

DUNSMORE MOUNTAIN SW, NORTH CAROLINA
3.75 MINUTE SERIES
SHEET NUMBER 62 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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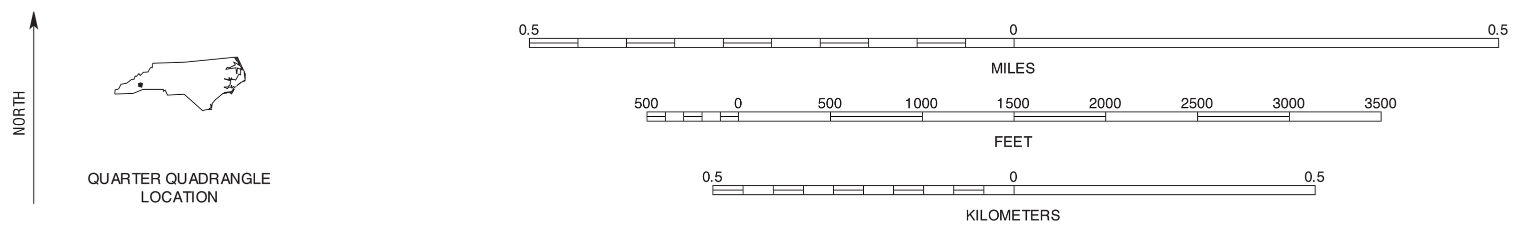
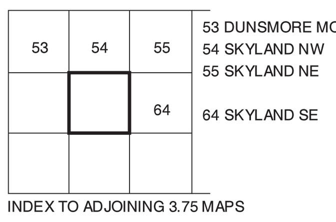
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.





SKYLAND SW, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 63 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

BUNCOMBE COUNTY, NORTH CAROLINA
SKYLAND SE QUADRANGLE
SHEET NUMBER 64 OF 64

Joins sheet 54, Skyland NW

Joins sheet 55, Skyland NE

Joins sheet 56, Fruitland NW

Joins sheet 63, Skyland SW

82° 33′45″ 82° 30′00″
35° 26′15″ 35° 22′30″

82° 33′45″ 82° 30′00″

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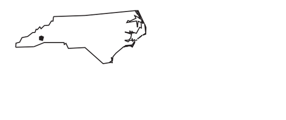
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

54	55	56
63		

54 SKYLAND NW
55 SKYLAND NE
56 FRUITLAND NW
63 SKYLAND SW

INDEX TO ADJOINING 3.75 MAPS

SKYLAND SE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 64 OF 64

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

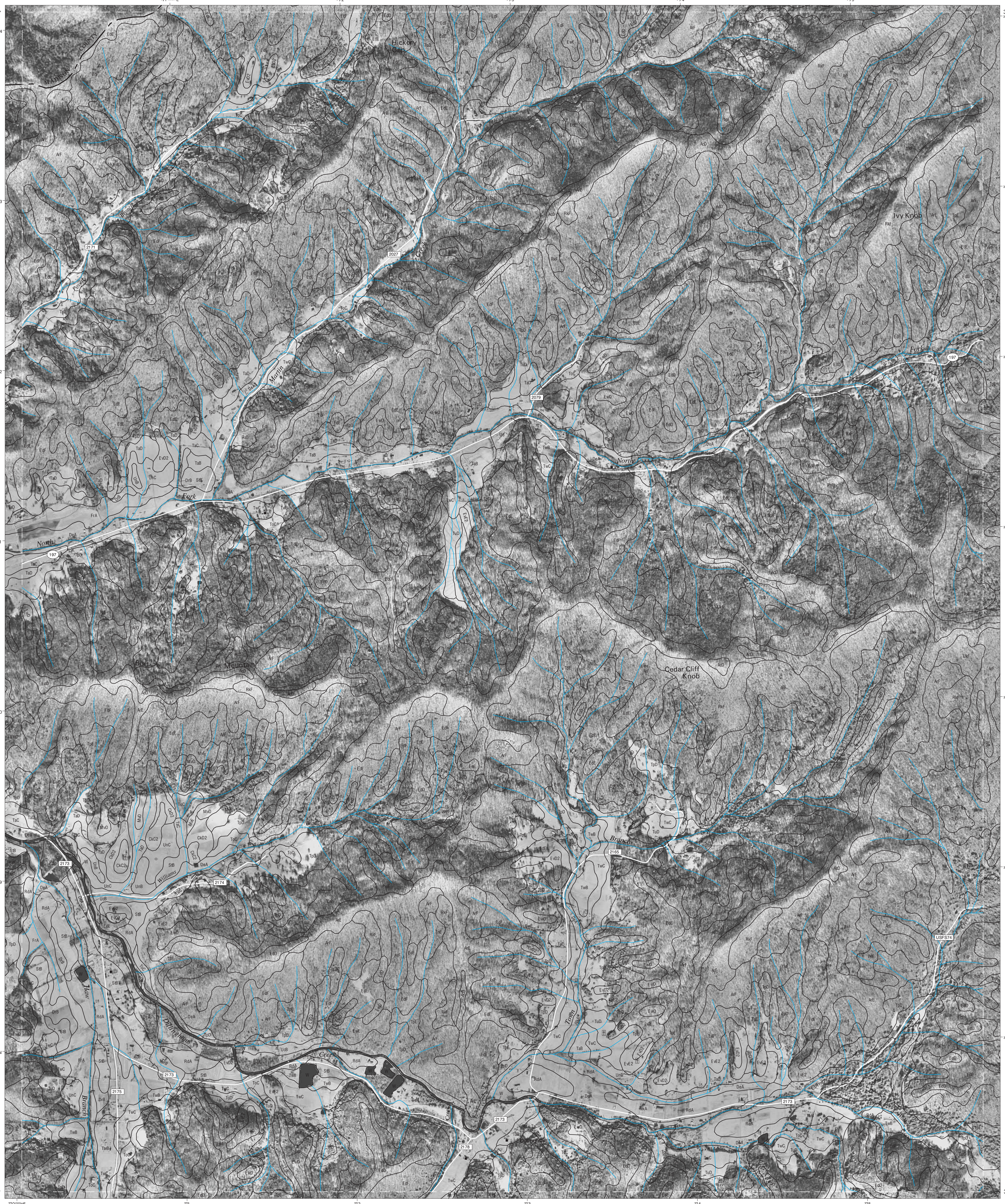
BUNCOMBE COUNTY, NORTH CAROLINA
BARNARDSVILLE SE QUADRANGLE
SHEET NUMBER 7 OF 64

Joins sheet 1, Barnardsville NE

Joins sheet 2, Mount Mitchell NW

82° 26′15″ 82° 22′30″

35° 48′45″ 35° 48′45″



Joins sheet 6, Barnardsville SW

Joins sheet 8, Mount Mitchell SW

35° 45′00″ 35° 45′00″

82° 26′15″ 82° 22′30″

Joins sheet 15, Craggy Pinnacle NW

Joins sheet 16, Craggy Pinnacle NE

Joins sheet 17, Montreat NW

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NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES: 0.5 0 0.5

FEET: 500 0 500 1000 1500 2000 2500 3000 3500

KILOMETERS: 0.5 0 0.5

	1	2
6		8
15	16	17

1 BARNARDSVILLE NE
2 MOUNT MITCHELL NW
6 BARNARDSVILLE SW
8 MOUNT MITCHELL SW
15 CRAGGY PINNACLE NW
16 CRAGGY PINNACLE NE
17 MONTREAT NW

INDEX TO ADJOINING 3.75 MAPS

BARNARDSVILLE SE, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 7 OF 64

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UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

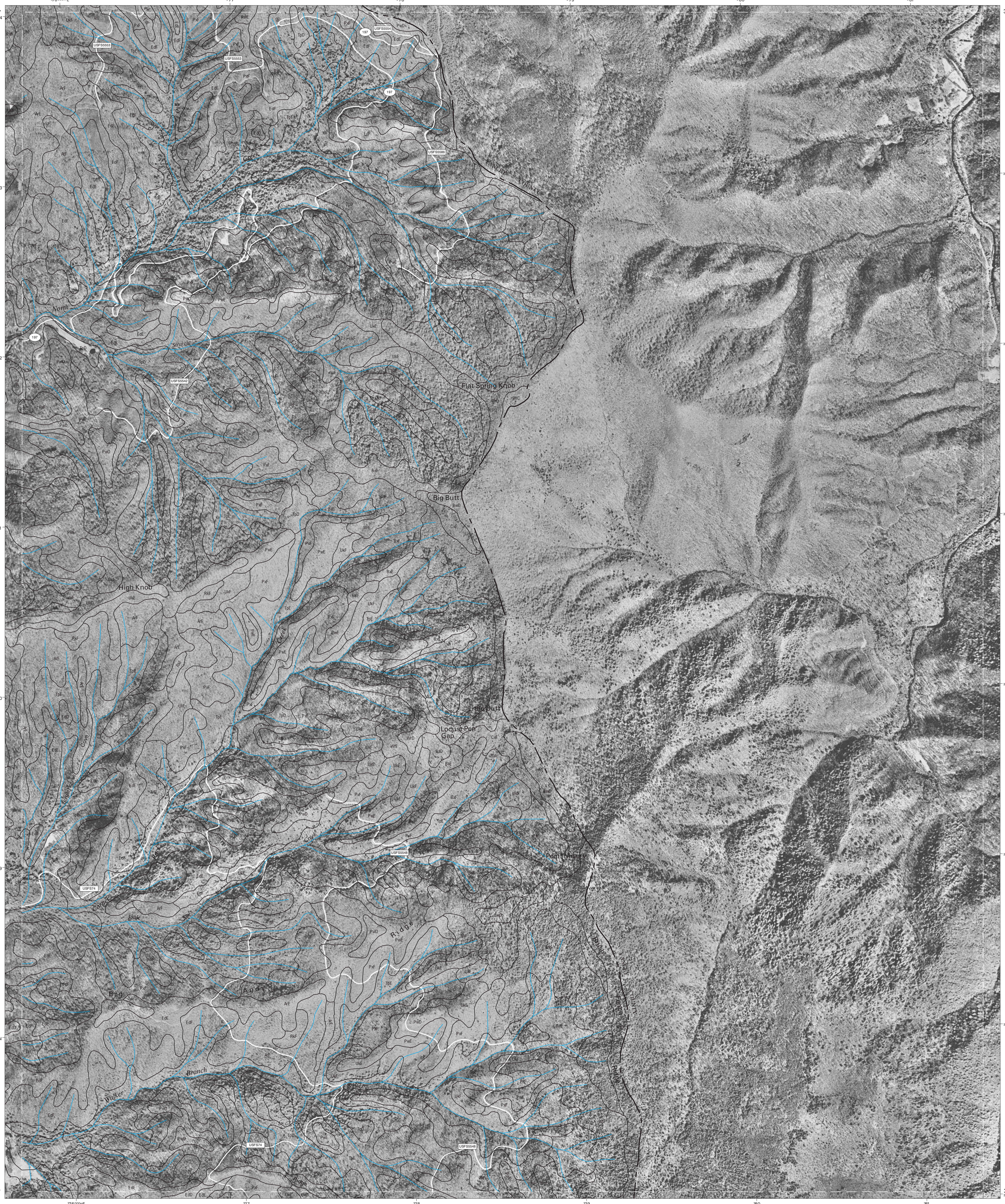
BUNCOMBE COUNTY, NORTH CAROLINA
MOUNT MITCHELL SW QUADRANGLE
SHEET NUMBER 8 OF 64

Joins sheet 1, Barnardsville NE

Joins sheet 2, Mount Mitchell NW

82° 22′30″ 82°18′45″

35° 48′45″ 35° 48′45″



35° 45′00″ 35° 45′00″

82° 22′30″ 82°18′45″

Joins sheet 16, Craggy Pinnacle NE

Joins sheet 17, Montreat NW

Joins sheet 18, Montreat NE

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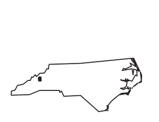
NORTH



QUARTER QUADRANGLE LOCATION

SCALE 1:12000

0.5 0 0.5
MILES

500 0 500 1000 1500 2000 2500 3000 3500
FEET

0.5 0 0.5
KILOMETERS

1	2	
7	■	
16	17	18

1 BARNARDSVILLE NE
2 MOUNT MITCHELL NW
7 BARNARDSVILLE SE
16 CRAGGY PINNACLE NE
17 MONTREAT NW
18 MONTREAT NE

INDEX TO ADJOINING 3.75 MAPS

MOUNT MITCHELL SW, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 8 OF 64

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NORTH

QUARTER QUADRANGLE LOCATION

SCALE 1:12000

MILES

FEET

KILOMETERS

INDEX TO ADJOINING 3.75 MAPS

10 SANDYMUSH NE
19 FINES CREEK SE
20 SANDYMUSH SW
21 SANDYMUSH SE

SANDYMUSH NW, NORTH CAROLINA

3.75 MINUTE SERIES
SHEET NUMBER 9 OF 64

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